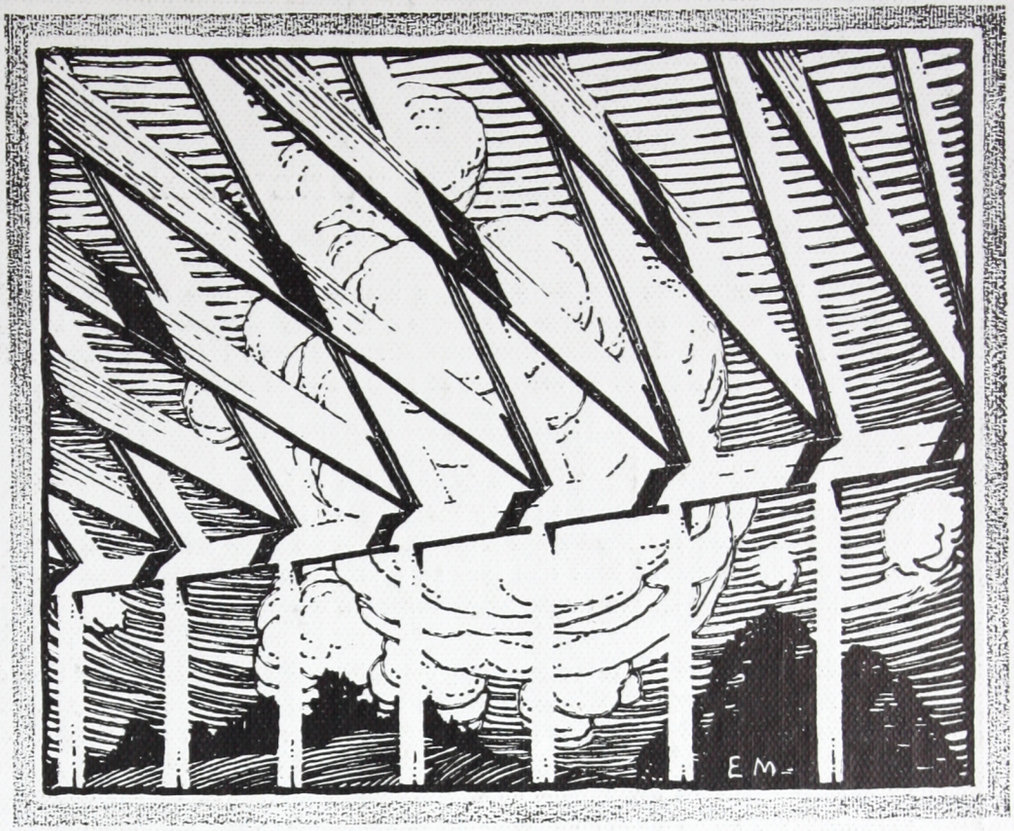
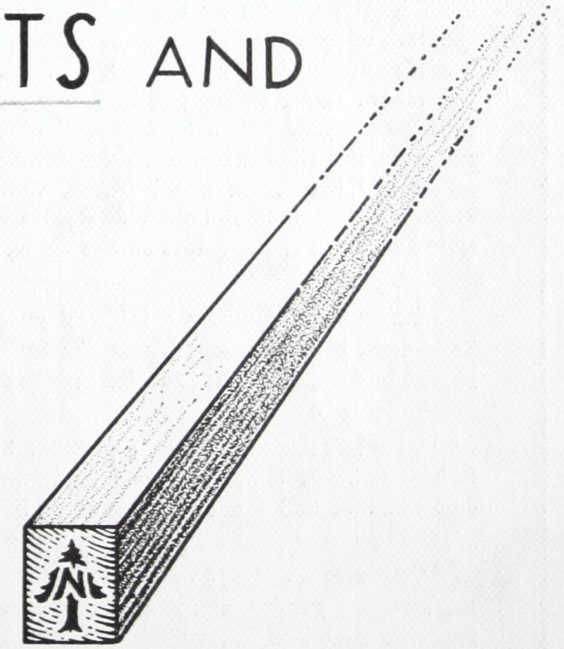
LUMBER AND ITS UTILIZATION



# MAXIMUM SPANS FOR JOISTS AND RAFTERS



NATIONAL LUMBER MANUFACTURERS ASSOCIATION

VOL·IV·CH·4 CONSTRUCTION INFORMATION SERIES

# FOREWORD

The tables in this chapter provide a means for readily ascertaining the maximum safe spans for joists and rafters under the uniform live loads ordinarily encountered in buildings and for the usual working stress, joist size, and spacing combinations. All span lengths given in the tables are for dressed lumber sizes as given on page 27 in the table of properties of American Standard Sizes for dimension lumber and timber.

To determine the maximum safe span for a joist, first ascertain the allowable working stress for the species and grade of lumber used by referring to the local building code or to Chapter VII of this series, Working Stresses for Structural Timber. Then in the table for the live load to be supported and reading across from the size of joist and spacing on centers used, the maximum allowable span will be found under the column headed by the allowable working stress.

Spans are given for two controlling conditions, one being so limited that deflection under the calculated load will not exceed 1/360 of the span length and the other determined by the bending strength of the piece. The deflection should be limited to prevent cracks where ceilings are covered with some hard, inelastic material such as plaster. Where ceilings are not so covered and a small amount of deflection is not objectionable, the span length may be determined by the bending strength or by the allowable horizontal shear stress (whichever governs) instead of by the stiffness of the member.

When the tables are used to determine the span lengths under heavier loads, the reader is cautioned to note that spans given for bending and deflection must be checked against those limited by horizontal shear for the particular load involved. Thus for a live load of 100 lbs. per sq. ft., it is essential to find both the span length limited by the horizontal shear stress and by the allowable stress in extreme fibre and use the shortest of the two. This is necessary as a joist might be of adequate size to support the load so far as its bending strength is concerned, but might fail because it had a greater span than justified by the allowable horizontal shear stress permitted, or, conversely, if the span was selected based on the allowable shear it might be greater than that permitted for bending. The ratio of extreme fibre stress to horizontal shear is not constant for all species, some having a relatively high extreme fibre stress in bending with a comparatively low horizontal shear stress, while for others the ratio is much different. Also, when designing for stiffness, that is to limit the deflection of the joist, it is necessary to check the deflection, bending, and shear spans and use the shortest of the three.

On page 27 appears a table of properties of American Standard Sizes of dimension lumber and timber. This data is supplementary to the table and is provided for use in conjunction with the usual formulas employed in designing structural members of wood.

The information in this chapter being adapted to American Standard Sizes of dressed lumber will, it is hoped, be of timely, practical service and convenience to building officials, architects, engineers, contractors and builders and those using lumber in building.

There is obtainable from the National Lumber Manufacturers Association information relating to working stresses, grades, and qualities of structural material which is useful both as general information and in conjunction with building codes. The data appearing in this chapter prepared under the direction of Richard G. Kimbell are issued under the authority and responsibility of the National Lumber Manufacturers Association.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 30 Pounds per Square Foot with Plastered Ceiling. Live Load 40 Pounds per Square Food with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Limited by Deflection of 1/360 of the Span. Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | Determined by Bending. Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 9— 1 | 9— 9 | 10— 2 | 10— 8 | 10— 4 | 10—11 | 11— 6 | 12— 0 | 12— 6 | 13— 0 | 13— 5 | 13—10 | 14— 3 | 14— 8 |
| | 16 | 8— 4 | 8—11 | 9— 3 | 9— 9 | 9— 1 | 9— 6 | 10— 0 | 10— 6 | 10—10 | 11— 3 | 11— 8 | 12— 1 | 12— 5 | 12—10 |
| | 24 | 7— 3 | 7— 9 | 8— 2 | 8— 6 | 7— 5 | 7—10 | 8— 3 | 8— 7 | 9— 0 | 9— 4 | 9— 7 | 10— 0 | 10— 2 | 10— 6 |
| 2 x 8 | 12 | 12— 0 | 12—10 | 13— 6 | 14— 0 | 13— 9 | 14— 6 | 15— 3 | 15—11 | 16— 6 | 17— 2 | 17— 9 | 18— 4 | 18—10 | 19— 5 |
| | 16 | 11— 0 | 11— 9 | 12— 4 | 12—11 | 12— 0 | 12— 8 | 13— 4 | 13—11 | 14— 5 | 15— 0 | 15— 6 | 16— 0 | 16— 6 | 17— 0 |
| | 24 | 9— 8 | 10— 3 | 10—10 | 11— 4 | 9—11 | 10— 5 | 10—11 | 11— 5 | 11—11 | 12— 4 | 12— 9 | 13— 3 | 13— 7 | 14— 0 |
| 2 x 10 | 12 | 15— 2 | 16— 1 | 17— 0 | 17— 9 | 17— 3 | 18— 3 | 19— 1 | 19—11 | 20— 8 | 21— 6 | 22— 3 | 23— 0 | 23— 8 | 24— 4 |
| | 16 | 13—11 | 14—10 | 15— 6 | 16— 3 | 15— 1 | 15—11 | 16— 8 | 17— 4 | 18— 2 | 18—10 | 19— 6 | 20— 1 | 20— 9 | 21— 4 |
| | 24 | 12— 2 | 13— 0 | 13— 8 | 14— 4 | 12— 6 | 13— 3 | 13—10 | 14— 5 | 15— 0 | 15— 7 | 16— 1 | 16— 7 | 17— 1 | 17— 8 |
| 2 x 12 | 12 | 18— 3 | 19— 5 | 20— 5 | 21— 4 | 20— 8 | 21—10 | 22—11 | 23—11 | 24—10 | 25— 9 | 26— 8 | 27— 7 | 28— 5 | 29— 3 |
| | 16 | 16— 9 | 17—10 | 18— 8 | 19— 6 | 18— 1 | 19— 3 | 20— 1 | 20—11 | 21—10 | 22— 8 | 23— 5 | 24— 3 | 24—11 | 25— 8 |
| | 24 | 14— 9 | 15— 8 | 16— 6 | 17— 3 | 15— 0 | 15—10 | 16— 7 | 17— 5 | 18— 1 | 18— 9 | 19— 5 | 20— 0 | 20— 8 | 21— 3 |
| 2 x 14 | 12 | 21— 3 | 22— 7 | 23— 9 | 24— 9 | 24— 0 | 25— 3 | 26— 6 | 27— 8 | 28— 9 | 29—10 | 30— 0 | | | |
| | 16 | 19— 6 | 20— 9 | 21— 9 | 22— 9 | 21— 0 | 22— 3 | 23— 4 | 24— 4 | 25— 3 | 26— 4 | 27— 3 | 28— 1 | 29— 0 | 29—10 |
| | 24 | 17— 3 | 18— 4 | 19— 4 | 20— 2 | 17— 6 | 18— 6 | 19— 4 | 20— 3 | 21— 0 | 21—10 | 22— 7 | 23— 4 | 24— 1 | 24— 9 |
| 3 x 6 | 12 | 10— 6 | 11— 2 | 11—10 | 12— 4 | 13— 0 | 13— 8 | 14— 4 | 15— 0 | 15— 7 | 16— 2 | 16— 9 | 17— 4 | 17—10 | 18— 4 |
| | 16 | 9— 7 | 10— 2 | 10—10 | 11— 4 | 11— 4 | 12— 0 | 12— 6 | 13— 1 | 13— 8 | 14— 2 | 14— 8 | 15— 2 | 15— 8 | 16— 1 |
| | 24 | 8— 6 | 9— 0 | 9— 6 | 10— 0 | 9— 4 | 9—11 | 10— 4 | 10—10 | 11— 3 | 11— 7 | 12— 1 | 12— 6 | 12—11 | 13— 3 |
| 3 x 8 | 12 | 13—11 | 14—10 | 15— 7 | 16— 4 | 17— 1 | 17—11 | 18—10 | 19— 8 | 20— 6 | 21— 3 | 22— 0 | 22— 9 | 23— 5 | 24— 2 |
| | 16 | 12—10 | 13— 8 | 14— 4 | 14—11 | 15— 0 | 15— 9 | 16— 7 | 17— 4 | 18— 0 | 18— 8 | 19— 4 | 20— 0 | 20— 7 | 21— 2 |
| | 24 | 11— 3 | 12— 0 | 12— 8 | 13— 2 | 12— 5 | 13— 1 | 13— 9 | 14— 4 | 14—11 | 15— 6 | 16— 0 | 16— 7 | 17— 1 | 17— 6 |
| 3 x 10 | 12 | 17— 6 | 18— 7 | 19— 6 | 20— 5 | 21— 3 | 22— 5 | 23— 6 | 24— 7 | 25— 7 | 26— 7 | 27— 6 | 28— 5 | 29— 3 | 30— 0 |
| | 16 | 16— 0 | 17— 0 | 17—11 | 18— 9 | 18— 9 | 19— 9 | 20— 9 | 21— 8 | 22— 7 | 23— 5 | 24— 3 | 25— 0 | 25— 9 | 26— 6 |
| | 24 | 13— 2 | 15— 1 | 15—11 | 16— 8 | 15— 7 | 16— 5 | 17— 3 | 18— 0 | 18— 9 | 19— 5 | 20— 2 | 20—10 | 21— 5 | 22— 1 |
| 3 x 12 | 12 | 20—11 | 22— 3 | 23— 5 | 24— 5 | 25— 5 | 26— 9 | 28— 1 | 29— 4 | 30— 0 | | | | | |
| | 16 | 19— 4 | 20— 6 | 21— 7 | 22— 7 | 22— 5 | 23— 8 | 24—10 | 25—11 | 27— 0 | 28— 0 | 29— 0 | 30— 0 | | |
| | 24 | 17— 1 | 18— 2 | 19— 2 | 19—11 | 18— 9 | 19— 9 | 20— 9 | 21— 8 | 22— 6 | 23— 4 | 24— 2 | 25— 0 | 25— 9 | 26— 6 |
| 3 x 14 | 12 | 23— 4 | 25—11 | 27— 3 | 28— 6 | 29— 5 | 30— 0 | | | | | | | | |
| | 16 | 22— 6 | 23—10 | 25— 2 | 26— 4 | 26— 1 | 27— 6 | 28—10 | 30— 0 | | | | | | |
| | 24 | 20— 0 | 21— 3 | 22— 4 | 23— 4 | 21— 8 | 23— 0 | 24— 3 | 25— 2 | 26— 3 | 27— 3 | 28— 2 | 29— 1 | 30— 0 | |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."
Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—30 pounds per square foot of floor area with ceiling plastered, or 40 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 40 Pounds per Square Foot with Plastered Ceiling. Live Load 50 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 8— 6 | 9— 1 | 9— 6 | 10— 0 | 9— 6 | 10— 0 | 10— 5 | 10—11 | 11— 4 | 11—10 | 12— 2 | 12— 7 | 13— 0 | 13— 5 |
| | 16 | 7— 9 | 8— 3 | 8— 8 | 9— 1 | 8— 3 | 8— 8 | 9— 1 | 9 —6 | 9—10 | 10— 3 | 10— 8 | 11— 0 | 11— 4 | 11— 7 |
| | 24 | 6—10 | 7— 3 | 7— 7 | 8— 0 | 6— 9 | 7— 1 | 7— 6 | 7—10 | 8— 1 | 8— 5 | 8— 9 | 9— 0 | 9— 3 | 9— 6 |
| 2 x 8 | 12 | 11— 5 | 12— 0 | 12— 8 | 13— 3 | 12— 6 | 13— 2 | 13—10 | 14— 5 | 15— 0 | 15— 7 | 16— 1 | 16— 8 | 17— 2 | 17— 8 |
| | 16 | 10— 5 | 11— 0 | 11— 7 | 12— 1 | 10—11 | 11— 6 | 12— 0 | 12— 7 | 13— 1 | 13— 8 | 14— 1 | 14— 6 | 15— 0 | 15— 5 |
| | 24 | 9— 2 | 9— 8 | 10— 2 | 10— 8 | 8—11 | 9— 5 | 9—11 | 10— 4 | 10— 9 | 11— 2 | 11— 7 | 12— 0 | 12— 4 | 12— 8 |
| 2 x 10 | 12 | 14— 4 | 15— 2 | 16— 0 | 16— 8 | 15— 9 | 16— 7 | 17— 4 | 18— 2 | 18—11 | 19— 7 | 20— 3 | 21— 0 | 21— 8 | 22— 3 |
| | 16 | 13— 1 | 13—10 | 14— 7 | 15— 3 | 13— 9 | 14— 6 | 15— 2 | 15—10 | 16— 6 | 17— 1 | 17— 9 | 18— 4 | 18—10 | 19— 5 |
| | 24 | 11— 6 | 12— 2 | 12—10 | 13— 5 | 11— 4 | 11—11 | 12— 6 | 13— 1 | 13— 8 | 14— 1 | 14— 7 | 15— 1 | 15— 7 | 16— 0 |
| 2 x 12 | 12 | 17— 3 | 18— 3 | 19— 3 | 20— 1 | 18—11 | 19—11 | 20—11 | 21—11 | 22— 8 | 23— 6 | 24— 5 | 25— 2 | 26— 0 | 26— 9 |
| | 16 | 15— 9 | 16— 9 | 17— 7 | 18— 5 | 16— 6 | 17— 5 | 18— 3 | 19— 1 | 19—11 | 20— 7 | 21— 4 | 22— 0 | 22— 9 | 23— 5 |
| | 24 | 13—10 | 14— 9 | 15— 6 | 16— 2 | 13— 8 | 14— 4 | 15— 1 | 15— 9 | 16— 5 | 17— 0 | 17— 7 | 18— 2 | 18— 9 | 19— 4 |
| 2 x 14 | 12 | 20— 0 | 21— 2 | 22— 6 | 23— 5 | 21—11 | 23— 2 | 24— 3 | 25— 4 | 26— 4 | 27— 4 | 28— 4 | 29— 4 | 30— 0 | |
| | 16 | 18— 4 | 19— 6 | 20— 6 | 21— 5 | 19— 3 | 20— 3 | 21— 3 | 22— 3 | 23— 2 | 24— 0 | 24—10 | 25— 8 | 26— 6 | 27— 3 |
| | 24 | 16— 3 | 17— 3 | 18— 1 | 18—11 | 15—11 | 16— 9 | 17— 7 | 18— 5 | 19— 2 | 19—10 | 20— 7 | 21— 3 | 21—11 | 22— 6 |
| 3 x 6 | 12 | 9—11 | 10— 6 | 11— 2 | 11— 8 | 11—10 | 12— 5 | 13— 1 | 13— 8 | 14— 3 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 9 |
| | 16 | 9— 1 | 9— 8 | 10— 2 | 10— 8 | 10— 4 | 10—11 | 11— 5 | 11—11 | 12— 5 | 12—10 | 13— 4 | 13— 9 | 14— 3 | 14— 9 |
| | 24 | 7—11 | 8— 5 | 8—11 | 9— 4 | 8— 6 | 8—11 | 9— 5 | 9— 9 | 10— 3 | 10— 8 | 11— 0 | 11— 4 | 11— 9 | 12— 0 |
| 3 x 8 | 12 | 13— 1 | 13—11 | 14— 8 | 15— 4 | 15— 7 | 16— 5 | 17— 3 | 18— 0 | 18— 9 | 19— 5 | 20— 1 | 20— 9 | 21— 5 | 22— 0 |
| | 16 | 12— 0 | 12— 9 | 13— 5 | 14— 0 | 13— 8 | 14— 5 | 15— 1 | 15— 9 | 16— 5 | 17— 0 | 17— 8 | 18— 3 | 18— 9 | 19— 4 |
| | 24 | 10— 8 | 11— 3 | 11—10 | 12— 4 | 11— 3 | 11—10 | 12— 5 | 13— 0 | 13— 7 | 14— 1 | 14— 7 | 15— 0 | 15— 6 | 15—11 |
| 3 x 10 | 12 | 16— 5 | 17— 6 | 18— 5 | 19— 3 | 19— 6 | 20— 7 | 21— 7 | 22— 6 | 23— 3 | 24— 4 | 25— 2 | 26— 0 | 26— 9 | 27— 7 |
| | 16 | 15— 1 | 16— 1 | 16—11 | 17— 8 | 17— 2 | 18— 1 | 18—11 | 19— 9 | 20— 8 | 21— 4 | 22— 2 | 22—10 | 23— 7 | 24— 3 |
| | 24 | 13— 4 | 14— 2 | 14—11 | 15— 7 | 14— 3 | 15— 0 | 15— 9 | 16— 5 | 17— 1 | 17— 9 | 18— 4 | 18—11 | 19— 6 | 20— 1 |
| 3 x 12 | 12 | 19— 9 | 20—11 | 22— 1 | 23— 1 | 23— 4 | 24— 7 | 25— 9 | 26—11 | 28— 0 | 29— 1 | 30— 0 | | | |
| | 16 | 18— 2 | 19— 4 | 20— 4 | 21— 3 | 20— 6 | 21— 8 | 22— 9 | 23— 9 | 24— 8 | 25— 8 | 26— 6 | 27— 5 | 28— 3 | 29— 1 |
| | 24 | 16— 1 | 17— 1 | 18— 0 | 18— 9 | 17— 1 | 18— 0 | 18—10 | 19— 9 | 20— 6 | 21— 4 | 22— 1 | 22— 9 | 23— 6 | 24— 2 |
| 3 x 14 | 12 | 23— 1 | 24— 5 | 25— 9 | 26—11 | 27— 0 | 28— 6 | 30— 0 | | | | | | | |
| | 16 | 21— 3 | 22— 6 | 23— 9 | 24—10 | 23—11 | 25— 2 | 26— 5 | 27— 7 | 28— 9 | 29— 9 | 30— 0 | | | |
| | 24 | 18— 9 | 20— 0 | 21— 0 | 22— 1 | 19—11 | 21— 0 | 22— 0 | 23— 0 | 23—11 | 24—10 | 25— 9 | 26— 7 | 27— 5 | 28— 2 |

**NOTE.**—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—40 pounds per square foot of floor area with plastered ceiling, or 50 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 50 Pounds per Square Foot with Plastered Ceiling. Live Load 60 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 8— 1 | 8— 7 | 9— 0 | 9— 6 | 8— 9 | 9— 3 | 9— 8 | 10— 0 | 10— 6 | 10—11 | 11— 3 | 11— 7 | 11—11 | 12— 4 |
| | 16 | 7— 4 | 7—10 | 8— 3 | 8— 7 | 7— 8 | 8— 0 | 8— 4 | 8— 9 | 9— 1 | 9— 5 | 9— 9 | 10— 1 | 10— 5 | 10— 9 |
| | 24 | 6— 6 | 6—10 | 7— 3 | 7— 7 | 6— 3 | 6— 7 | 6—10 | 7— 3 | 7— 6 | 7—10 | 8— 1 | 8— 4 | 8— 6 | 8—10 |
| 2 x 8 | 12 | 10— 9 | 11— 5 | 12— 0 | 12— 7 | 11— 7 | 12— 2 | 12— 9 | 13— 4 | 13—10 | 14— 5 | 14—11 | 15— 5 | 15—10 | 16— 3 |
| | 16 | 9— 9 | 10— 5 | 11— 0 | 11— 6 | 10— 1 | 10— 8 | 11— 2 | 11— 8 | 12— 2 | 12— 7 | 13— 0 | 13— 5 | 13—10 | 14— 3 |
| | 24 | 8— 7 | 9— 2 | 9— 8 | 10— 1 | 8— 3 | 8— 9 | 9— 2 | 9— 6 | 9—11 | 10— 4 | 10— 8 | 11— 0 | 11— 4 | 11— 8 |
| 2 x 10 | 12 | 13— 7 | 14— 5 | 15— 2 | 15—10 | 14— 7 | 15— 4 | 16— 1 | 16—10 | 17— 6 | 18— 2 | 18— 9 | 19— 5 | 19—11 | 20— 7 |
| | 16 | 12— 5 | 13— 2 | 13—10 | 14— 7 | 12— 8 | 13— 4 | 14— 0 | 14— 8 | 15— 3 | 15—10 | 16— 5 | 16—11 | 17— 6 | 18— 0 |
| | 24 | 10— 0 | 11— 7 | 12— 2 | 12— 9 | 10— 5 | 11— 0 | 11— 6 | 12— 1 | 12— 7 | 13— 1 | 13— 6 | 13—11 | 14— 4 | 14— 9 |
| 2 x 12 | 12 | 16— 4 | 17— 5 | 18— 3 | 19— 1 | 17— 6 | 18— 5 | 19— 4 | 20— 2 | 21— 0 | 21—10 | 22— 7 | 23— 4 | 24— 0 | 24— 9 |
| | 16 | 14—11 | 15—10 | 16— 9 | 17— 6 | 15— 3 | 16— 2 | 16—11 | 17— 8 | 18— 5 | 19— 1 | 19— 9 | 20— 5 | 21— 0 | 21— 8 |
| | 24 | 13— 1 | 14— 0 | 14— 9 | 15— 5 | 12— 7 | 13— 4 | 13—11 | 14— 7 | 15— 2 | 15— 9 | 16— 3 | 16—10 | 17— 4 | 17—10 |
| 2 x 14 | 12 | 19— 1 | 20— 3 | 21— 4 | 22— 4 | 20— 4 | 21— 5 | 22— 6 | 23— 6 | 24— 6 | 25— 4 | 26— 3 | 27— 1 | 28— 0 | 28— 9 |
| | 16 | 17— 6 | 18— 6 | 19— 6 | 20— 5 | 17—10 | 18— 9 | 19— 8 | 20— 7 | 21— 5 | 22— 3 | 23— 0 | 23— 9 | 24— 6 | 25— 3 |
| | 24 | 15— 5 | 16— 4 | 17— 3 | 18— 0 | 14— 8 | 15— 6 | 16— 3 | 17— 0 | 17— 8 | 18— 4 | 19— 0 | 19— 8 | 20— 3 | 20—10 |
| 3 x 6 | 12 | 9— 5 | 9— 8 | 10— 6 | 11— 0 | 10—11 | 11— 6 | 12— 1 | 12— 7 | 13— 2 | 13— 8 | 14— 1 | 14— 7 | 15— 0 | 15— 6 |
| | 16 | 8— 7 | 9— 1 | 9— 7 | 10— 0 | 9— 6 | 10— 0 | 10— 6 | 11— 0 | 11— 6 | 11—11 | 12— 3 | 12— 8 | 13— 1 | 13— 5 |
| | 24 | 7— 6 | 8— 0 | 8— 5 | 8—10 | 7—10 | 8— 3 | 8— 8 | 9— 0 | 9— 5 | 9—10 | 10— 1 | 10— 5 | 10— 9 | 11— 1 |
| 3 x 8 | 12 | 12— 6 | 13— 3 | 14— 0 | 14— 7 | 14— 5 | 15— 2 | 16— 0 | 16— 8 | 17— 4 | 18— 0 | 18— 8 | 19— 3 | 19—10 | 20— 5 |
| | 16 | 11— 5 | 12— 1 | 12— 9 | 13— 4 | 12— 7 | 13— 4 | 14— 0 | 14— 6 | 15— 2 | 15— 9 | 16— 4 | 16—10 | 17— 4 | 17—10 |
| | 24 | 10— 1 | 10— 8 | 11— 3 | 11— 9 | 10— 5 | 11— 0 | 11— 6 | 12— 0 | 12— 6 | 13— 0 | 13— 6 | 13—11 | 14— 4 | 14— 9 |
| 3 x 10 | 12 | 15— 9 | 16— 8 | 17— 7 | 18— 4 | 18— 1 | 19— 1 | 20— 0 | 20—11 | 21— 9 | 22— 7 | 23— 4 | 24— 2 | 24— 9 | 25— 7 |
| | 16 | 14— 5 | 15— 3 | 16— 1 | 16—10 | 15—11 | 16— 9 | 17— 6 | 18— 4 | 19— 1 | 19—10 | 20— 6 | 21— 2 | 21—10 | 22— 5 |
| | 24 | 12— 8 | 13— 5 | 14— 2 | 14—10 | 13— 1 | 13—10 | 14— 6 | 15— 2 | 15— 9 | 16— 4 | 16—11 | 17— 6 | 18— 1 | 18— 7 |
| 3 x 12 | 12 | 18—10 | 20— 0 | 21— 1 | 22— 0 | 21— 8 | 22—10 | 24— 0 | 25— 0 | 26— 0 | 27— 0 | 28— 0 | 29— 0 | 29—10 | 30— 0 |
| | 16 | 17— 4 | 18— 4 | 19— 4 | 20— 3 | 19— 0 | 20— 1 | 21— 1 | 22— 0 | 22—11 | 23—10 | 24— 8 | 25— 5 | 26— 2 | 27— 0 |
| | 24 | 15— 3 | 16— 3 | 17— 1 | 17—10 | 15—10 | 16— 8 | 17— 6 | 18— 3 | 19— 0 | 19— 9 | 20— 5 | 21— 1 | 21— 9 | 22— 4 |
| 3 x 14 | 12 | 21—11 | 23— 5 | 24— 7 | 25— 8 | 25— 2 | 26— 7 | 27—10 | 29— 1 | 30— 0 | | | | | |
| | 16 | 20— 2 | 21— 5 | 22— 7 | 23— 8 | 22— 2 | 23— 5 | 24— 6 | 25— 8 | 26— 9 | 27— 8 | 28— 8 | 29— 8 | 30— 0 | |
| | 24 | 17—10 | 18—11 | 20— 0 | 20—10 | 18— 5 | 19— 5 | 20— 5 | 21— 4 | 22— 2 | 23— 0 | 23—10 | 24— 8 | 25— 4 | 26— 1 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—50 pounds per square foot of floor area with plastered ceiling, or
60 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 60 Pounds per Square Foot with Plastered Ceiling. Live Load 70 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 7— 9 | 8— 2 | 8— 8 | 9— 0 | 8— 1 | 8— 6 | 9— 0 | 9— 5 | 9— 9 | 10— 2 | 10— 6 | 10—10 | 11— 2 | 11— 6 |
| | 16 | 7— 0 | 7— 6 | 7—11 | 8— 3 | 7— 1 | 7— 5 | 7—10 | 8— 1 | 8— 6 | 8—10 | 9— 1 | 9— 5 | 9— 9 | 10— 0 |
| | 24 | 6— 2 | 6— 6 | 6—11 | 7— 2 | 5— 9 | 6— 1 | 6— 5 | 6— 8 | 6—11 | 7— 2 | 7— 6 | 7— 8 | 7—11 | 8— 2 |
| 2 x 8 | 12 | 10— 2 | 10—11 | 11— 6 | 12— 0 | 10— 9 | 11— 4 | 11—11 | 12— 5 | 13— 0 | 13— 6 | 13—11 | 14— 5 | 14—10 | 15— 3 |
| | 16 | 9— 4 | 9—11 | 10— 6 | 11— 0 | 9— 5 | 9—11 | 10— 4 | 10—10 | 11— 3 | 11— 8 | 12— 1 | 12— 6 | 12—11 | 13— 3 |
| | 24 | 8— 2 | 8— 9 | 9— 2 | 9— 7 | 7— 8 | 8— 1 | 8— 6 | 8—11 | 9— 3 | 9— 7 | 9—11 | 10— 3 | 10— 6 | 10—11 |
| 2 x 10 | 12 | 13— 0 | 13— 9 | 14— 6 | 15— 2 | 13— 7 | 14— 4 | 15— 0 | 15— 8 | 16— 4 | 16—11 | 17— 6 | 18— 1 | 18— 8 | 19— 2 |
| | 16 | 11—10 | 12— 7 | 13— 3 | 13—10 | 11—10 | 12— 6 | 13— 1 | 13— 8 | 14— 3 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 9 |
| | 24 | 10— 5 | 11— 0 | 11— 8 | 12— 1 | 9— 9 | 10— 3 | 10— 9 | 11— 3 | 11— 9 | 12— 2 | 12— 7 | 13— 0 | 13— 4 | 13— 9 |
| 2 x 12 | 12 | 15— 8 | 16— 8 | 17— 6 | 18— 3 | 16— 4 | 17— 3 | 18— 1 | 18—11 | 19— 8 | 20— 5 | 21— 1 | 21—10 | 22— 6 | 23— 2 |
| | 16 | 14— 4 | 15— 2 | 16— 0 | 16— 8 | 14— 3 | 15— 1 | 15— 9 | 16— 6 | 17— 2 | 17— 9 | 18— 5 | 19— 0 | 19— 8 | 20— 2 |
| | 24 | 12— 6 | 13— 4 | 14— 0 | 14— 8 | 11— 9 | 12— 4 | 13— 0 | 13— 7 | 14— 2 | 14— 8 | 15— 2 | 15— 8 | 16— 2 | 16— 7 |
| 2 x 14 | 12 | 18— 3 | 19— 5 | 20— 5 | 21— 4 | 19— 1 | 20— 1 | 21— 1 | 22— 0 | 22—11 | 23—10 | 24— 7 | 25— 5 | 26— 3 | 26—11 |
| | 16 | 16— 7 | 17— 9 | 18— 7 | 19— 6 | 16— 7 | 17— 6 | 18— 5 | 19— 3 | 20— 0 | 20—10 | 21— 6 | 22— 3 | 22—11 | 23— 7 |
| | 24 | 14— 9 | 15— 7 | 16— 5 | 17— 3 | 13— 9 | 14— 6 | 15— 3 | 15—11 | 16— 6 | 17— 1 | 17— 9 | 18— 4 | 18—11 | 19— 5 |
| 3 x 6 | 12 | 9— 0 | 9— 7 | 10— 1 | 10— 6 | 10— 3 | 10—10 | 11— 4 | 11—10 | 12— 4 | 12—10 | 13— 3 | 13— 7 | 14— 0 | 14— 6 |
| | 16 | 8— 3 | 8— 9 | 9— 3 | 9— 7 | 8—11 | 9— 5 | 9—10 | 10— 4 | 10— 9 | 11— 1 | 11— 6 | 11—11 | 12— 3 | 12— 7 |
| | 24 | 7— 3 | 7— 7 | 8— 1 | 8— 5 | 7— 4 | 7— 9 | 8— 1 | 8— 5 | 8—10 | 9— 1 | 9— 5 | 9— 9 | 10— 0 | 10— 4 |
| 3 x 8 | 12 | 11—11 | 12— 9 | 13— 4 | 14— 0 | 13— 6 | 14— 3 | 14—11 | 15— 7 | 16— 3 | 16—11 | 17— 5 | 18— 0 | 18— 7 | 19— 1 |
| | 16 | 10—11 | 11— 7 | 12— 3 | 12—10 | 11—10 | 12— 5 | 13— 0 | 13— 7 | 14— 3 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 9 |
| | 24 | 9— 7 | 10— 1 | 10— 9 | 11— 3 | 9— 9 | 10— 3 | 10— 9 | 11— 3 | 11— 9 | 12— 1 | 12— 6 | 13— 0 | 13— 4 | 13— 9 |
| 3 x 10 | 12 | 15— 0 | 15—11 | 16—10 | 17— 7 | 17— 0 | 17—11 | 18—10 | 19— 7 | 20— 5 | 21— 3 | 21—11 | 22— 7 | 23— 4 | 24— 0 |
| | 16 | 13— 9 | 14— 7 | 15— 5 | 16— 1 | 14—10 | 15— 9 | 16— 5 | 17— 1 | 17—11 | 18— 6 | 19— 3 | 19—10 | 20— 5 | 21— 0 |
| | 24 | 12— 1 | 12—11 | 13— 6 | 14— 1 | 12— 3 | 12—11 | 13— 7 | 14— 1 | 14— 9 | 15— 4 | 15—10 | 16— 4 | 16—11 | 17— 4 |
| 3 x 12 | 12 | 18— 0 | 19— 3 | 20— 3 | 21— 1 | 20— 4 | 21— 5 | 22— 6 | 23— 6 | 24— 6 | 25— 5 | 26— 4 | 27— 1 | 28— 0 | 28—10 |
| | 16 | 16— 7 | 17— 7 | 18— 6 | 19— 4 | 17—11 | 18—10 | 19— 9 | 20— 7 | 21— 5 | 22— 4 | 23— 0 | 23—10 | 24— 6 | 25— 4 |
| | 24 | 14— 7 | 15— 6 | 16— 4 | 17— 0 | 14—10 | 15— 7 | 16— 4 | 17— 1 | 17— 9 | 18— 5 | 19— 1 | 19— 9 | 20— 4 | 20—11 |
| 3 x 14 | 12 | 21— 1 | 22— 5 | 23— 7 | 24— 7 | 23— 9 | 25— 0 | 26— 3 | 27— 4 | 28— 6 | 29— 6 | 30— 0 | | | |
| | 16 | 19— 5 | 20— 6 | 21— 7 | 22— 7 | 20—10 | 21—11 | 23— 0 | 24— 0 | 25— 0 | 26— 0 | 26—11 | 27—10 | 28— 7 | 29— 5 |
| | 24 | 17— 0 | 18— 1 | 19— 1 | 20— 0 | 17— 4 | 18— 5 | 19— 1 | 19—11 | 20—10 | 21— 6 | 22— 4 | 23— 0 | 23— 9 | 24— 5 |
| 4 x 6 | 12 | 9—11 | 10— 7 | 11— 1 | 11— 7 | 11—11 | 12— 6 | 13— 3 | 13— 9 | 14— 4 | 14—11 | 15— 5 | 15—11 | 16— 5 | 16—11 |
| | 16 | 9— 1 | 9— 9 | 10— 3 | 10— 9 | 10— 5 | 11— 0 | 11— 6 | 12— 0 | 12— 6 | 13— 0 | 13— 6 | 13—11 | 14— 4 | 14— 9 |
| | 24 | 8— 0 | 8— 6 | 9— 0 | 9— 4 | 8— 6 | 9— 0 | 9— 6 | 9—11 | 10— 4 | 10— 9 | 11— 0 | 11— 5 | 11—10 | 12— 1 |
| 4 x 8 | 12 | 13— 3 | 14— 0 | 14—10 | 15— 5 | 15— 9 | 16— 7 | 17— 5 | 18— 1 | 18—11 | 19— 7 | 20— 4 | 21— 0 | 21— 7 | 22— 3 |
| | 16 | 12— 1 | 12—11 | 13— 6 | 14— 1 | 13— 9 | 14— 6 | 15— 3 | 15—11 | 16— 6 | 17— 1 | 17— 9 | 18— 5 | 18—11 | 19— 6 |
| | 24 | 10— 7 | 11— 4 | 11—10 | 12— 5 | 11— 5 | 12— 0 | 12— 7 | 13— 1 | 13— 7 | 14— 3 | 14— 9 | 15— 3 | 15— 7 | 16— 1 |
| 4 x 10 | 12 | 16— 7 | 17— 7 | 18— 6 | 19— 5 | 19— 7 | 20— 9 | 21— 9 | 22— 9 | 23— 7 | 24— 6 | 25— 5 | 26— 3 | 27— 0 | 27—10 |
| | 16 | 15— 3 | 16— 1 | 17— 0 | 17—10 | 17— 4 | 18— 3 | 19— 1 | 19—11 | 20— 9 | 21— 6 | 22— 4 | 23— 0 | 23— 9 | 24— 5 |
| | 24 | 13— 5 | 14— 3 | 15— 0 | 15— 9 | 14— 4 | 15— 1 | 15—10 | 16— 6 | 17— 3 | 17—10 | 18— 6 | 19— 1 | 19— 9 | 20— 3 |

**NOTE.**—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—60 pounds per square foot of floor area with plastered ceiling, or 70 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 70 Pounds per Square Foot with Plastered Ceiling. Live Load 80 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 7— 5 | 7— 9 | 8— 2 | 8— 7 | 7— 8 | 8— 1 | 8— 6 | 8— 9 | 9— 2 | 9— 6 | 9—10 | 10— 2 | 10— 6 | 10— 9 |
| | 16 | 6— 8 | 7— 1 | 7— 6 | 7—10 | 6— 8 | 7— 0 | 7— 5 | 7— 8 | 8— 0 | 8— 4 | 8— 7 | 8—10 | 9— 2 | 9— 5 |
| | 24 | 5—10 | 6— 2 | 6— 7 | 6—10 | 5— 6 | 5— 9 | 6— 0 | 6— 5 | 6— 7 | 6—10 | 7— 1 | 7— 4 | 7— 6 | 7— 9 |
| 2 x 8 | 12 | 9— 9 | 10— 5 | 11— 0 | 11— 6 | 10— 1 | 10— 8 | 11— 2 | 11— 8 | 12— 2 | 12— 7 | 13— 2 | 13— 7 | 13—10 | 14— 5 |
| | 16 | 8—10 | 9— 6 | 10— 0 | 10— 6 | 8— 9 | 9— 4 | 9— 9 | 10— 2 | 10— 7 | 11— 0 | 11— 5 | 11— 9 | 12— 2 | 12— 6 |
| | 24 | 7— 9 | 8— 4 | 8— 9 | 9— 2 | 7— 4 | 7— 8 | 8— 0 | 8— 5 | 8— 8 | 9— 1 | 9— 5 | 9— 8 | 10— 0 | 10— 2 |
| 2 x 10 | 12 | 12— 5 | 13— 1 | 13—10 | 14— 6 | 12— 9 | 13— 6 | 14— 2 | 14— 9 | 15— 5 | 16— 0 | 16— 6 | 17— 1 | 17— 7 | 18— 1 |
| | 16 | 11— 4 | 12— 0 | 12— 8 | 13— 2 | 11— 2 | 11— 9 | 12— 4 | 12—10 | 13— 5 | 13—10 | 14— 5 | 14—10 | 15— 4 | 15— 9 |
| | 24 | 9—10 | 10— 6 | 11— 1 | 11— 7 | 9— 2 | 9— 7 | 10— 1 | 10— 7 | 11— 0 | 11— 5 | 11— 9 | 12— 2 | 12— 7 | 12—10 |
| 2 x 12 | 12 | 15— 0 | 15—10 | 16— 8 | 17— 6 | 15— 5 | 16— 4 | 17— 0 | 17— 9 | 18— 6 | 19— 2 | 19—10 | 20— 7 | 21— 2 | 21— 9 |
| | 16 | 13— 8 | 14— 6 | 15— 4 | 16— 0 | 13— 5 | 14— 2 | 14—10 | 15— 6 | 16— 2 | 16— 8 | 17— 5 | 17—10 | 18— 6 | 19— 0 |
| | 24 | 12— 0 | 12— 8 | 13— 5 | 14— 0 | 11— 1 | 11— 8 | 12— 2 | 12— 9 | 13— 4 | 13— 9 | 14— 4 | 14— 9 | 15— 2 | 15— 7 |
| 2 x 14 | 12 | 17— 6 | 18— 7 | 19— 7 | 20— 6 | 18— 0 | 19— 0 | 19—11 | 20—10 | 21— 7 | 22— 5 | 23— 3 | 24— 0 | 24— 9 | 25— 5 |
| | 16 | 16— 1 | 17— 0 | 17—11 | 18—10 | 15— 9 | 16— 7 | 17— 5 | 18— 3 | 18—11 | 19— 7 | 20— 4 | 21— 0 | 21— 7 | 22— 4 |
| | 24 | 14— 1 | 15— 0 | 15—10 | 16— 6 | 13— 0 | 13— 7 | 14— 4 | 15— 0 | 15— 7 | 16— 3 | 16— 9 | 17— 4 | 17—10 | 18— 4 |
| 3 x 6 | 12 | 8— 7 | 9— 3 | 9— 9 | 10— 1 | 9— 7 | 10— 1 | 10— 9 | 11— 1 | 11— 7 | 12— 0 | 12— 5 | 12—11 | 13— 4 | 13— 7 |
| | 16 | 7—11 | 8— 5 | 8—10 | 9— 3 | 8— 5 | 8—11 | 9— 4 | 9— 9 | 10— 1 | 10— 6 | 10—11 | 11— 3 | 11— 7 | 11—11 |
| | 24 | 6—11 | 7— 5 | 7— 9 | 8— 1 | 6—11 | 7— 4 | 7— 7 | 8— 0 | 8— 4 | 8— 7 | 8—11 | 9— 3 | 9— 6 | 9— 9 |
| 3 x 8 | 12 | 11— 6 | 12— 3 | 12—10 | 13— 5 | 12—10 | 13— 6 | 14— 1 | 14— 9 | 15— 5 | 15—11 | 16— 6 | 17— 0 | 17— 6 | 18— 0 |
| | 16 | 10— 6 | 11— 1 | 11— 9 | 12— 3 | 11— 1 | 11— 9 | 12— 4 | 12—10 | 13— 6 | 13—11 | 14— 5 | 14—10 | 15— 4 | 15— 9 |
| | 24 | 9— 3 | 9—10 | 10— 4 | 10—10 | 9— 3 | 9— 7 | 10— 1 | 10— 7 | 11— 1 | 11— 5 | 11—10 | 12— 3 | 12— 7 | 13— 0 |
| 3 x 10 | 12 | 14— 6 | 15— 5 | 16— 3 | 16—11 | 16— 0 | 16—11 | 17— 9 | 18— 6 | 19— 4 | 20— 0 | 20— 9 | 21— 5 | 22— 0 | 22— 9 |
| | 16 | 13— 3 | 14— 0 | 14—10 | 15— 5 | 14— 0 | 14—10 | 15— 6 | 16— 3 | 16—11 | 17— 6 | 18— 1 | 18— 9 | 19— 4 | 19—10 |
| | 24 | 11— 7 | 12— 4 | 13— 0 | 13— 7 | 11— 7 | 12— 3 | 12—10 | 13— 4 | 13—11 | 14— 5 | 14—11 | 15— 5 | 15—11 | 16— 4 |
| 3 x 12 | 12 | 17— 5 | 18— 6 | 19— 5 | 20— 5 | 19— 3 | 20— 3 | 21— 4 | 22— 3 | 23— 1 | 24— 0 | 24—10 | 25— 9 | 26— 5 | 27— 3 |
| | 16 | 15—11 | 16—11 | 17—10 | 18— 7 | 16—11 | 17—10 | 18— 9 | 19— 6 | 20— 4 | 21— 0 | 21—10 | 22— 6 | 23— 3 | 23—11 |
| | 24 | 14— 0 | 14—11 | 15— 9 | 16— 5 | 13—11 | 14— 9 | 15— 5 | 16— 1 | 16— 9 | 17— 5 | 18— 0 | 18— 7 | 19— 3 | 19— 9 |
| 3 x 14 | 12 | 20— 4 | 21— 7 | 22— 7 | 23— 9 | 22— 5 | 23— 7 | 24—10 | 25—11 | 26—11 | 27—11 | 28—11 | 29—11 | 30— 0 | |
| | 16 | 18— 7 | 19—10 | 20—11 | 21—10 | 19— 9 | 20— 9 | 21— 9 | 22— 9 | 23— 7 | 24— 6 | 25— 5 | 26— 3 | 27— 0 | 27—10 |
| | 24 | 16— 5 | 17— 6 | 18— 5 | 19— 3 | 16— 4 | 17— 3 | 18— 0 | 18—10 | 19— 7 | 20— 4 | 21— 0 | 21— 9 | 22— 5 | 23— 0 |
| 4 x 6 | 12 | 9— 7 | 10— 3 | 10— 9 | 11— 3 | 11— 3 | 11—11 | 12— 5 | 13— 0 | 13— 6 | 14— 0 | 14— 6 | 15— 0 | 15— 6 | 15—11 |
| | 16 | 8— 9 | 9— 4 | 9—10 | 10— 3 | 9—10 | 10— 4 | 10—11 | 11— 4 | 11—10 | 12— 3 | 12— 9 | 13— 1 | 13— 6 | 13—11 |
| | 24 | 7— 9 | 8— 1 | 8— 7 | 9— 0 | 8— 1 | 8— 6 | 8—11 | 9— 4 | 9— 9 | 10— 1 | 10— 5 | 10—10 | 11— 1 | 11— 5 |
| 4 x 8 | 12 | 12— 9 | 13— 6 | 14— 3 | 14—10 | 14—10 | 15— 9 | 16— 5 | 17— 1 | 17—10 | 18— 6 | 19— 3 | 19—10 | 20— 5 | 21— 0 |
| | 16 | 11— 7 | 12— 4 | 13— 0 | 13— 7 | 13— 0 | 13— 9 | 14— 5 | 15— 0 | 15— 7 | 16— 3 | 16—10 | 17— 4 | 17—11 | 18— 5 |
| | 24 | 10— 3 | 10—10 | 11— 5 | 12— 0 | 10— 9 | 11— 4 | 11—10 | 12— 5 | 12—11 | 13— 5 | 13—10 | 14— 4 | 14— 9 | 15— 3 |
| 4 x 10 | 12 | 15—11 | 16—11 | 17—10 | 18— 7 | 18— 7 | 19— 7 | 20— 7 | 21— 6 | 22— 4 | 23— 3 | 24— 0 | 24—10 | 25— 7 | 26— 4 |
| | 16 | 14— 7 | 15— 6 | 16— 5 | 17— 1 | 16— 4 | 17— 3 | 18— 1 | 18—11 | 19— 7 | 20— 5 | 21— 1 | 21—10 | 22— 5 | 23— 1 |
| | 24 | 12—11 | 13— 9 | 14— 5 | 15— 1 | 13— 6 | 14— 3 | 14—11 | 15— 7 | 16— 3 | 16—10 | 17— 5 | 18— 0 | 18— 6 | 19— 1 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—70 pounds per square foot of floor area with plastered ceiling, or 80 pounds per square foot with ceiling unplastered.

# MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 80 Pounds per Square Foot with Plastered Ceiling. Live Load 90 Pounds per Square Foot with Unplastered Ceiling.

MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span)

**Limited by Deflection of 1/360 of the Span**

Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span.

**Spans Determined by Bending (Read Carefully)**

Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of timber used, refer to the column below with the corresponding value to determine the span limited by the **bending strength** of the joist. **THEN** refer to the table on page 9 and in the same manner determine the span of the joist limited by **horizontal shear** and **use the shorter of the two spans.**

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 7— 1 | 7— 7 | 8— 0 | 8— 4 | 7— 2 | 7— 7 | 8— 0 | 8— 4 | 8— 8 | 9— 0 | 9— 4 | 9— 8 | 10— 0 | 10— 2 |
| | 16 | 6— 6 | 6—10 | 7— 2 | 7— 7 | 6— 4 | 6— 7 | 6—10 | 7— 2 | 7— 6 | 7— 9 | 8— 1 | 8— 5 | 8— 7 | 8— 9 |
| 2 x 8 | 12 | 9— 6 | 10— 1 | 10— 7 | 11— 1 | 9— 7 | 10— 1 | 10— 7 | 11— 1 | 11— 6 | 12— 0 | 12— 5 | 12— 9 | 13— 2 | 13— 7 |
| | 16 | 8— 7 | 9— 3 | 9— 7 | 10— 1 | 8— 4 | 8— 9 | 9— 2 | 9— 8 | 10— 1 | 10— 5 | 10— 9 | 11— 1 | 11— 6 | 11— 9 |
| | 24 | 7— 6 | 8— 0 | 8— 5 | 8— 9 | 6— 9 | 7— 2 | 7— 7 | 7—10 | 8— 2 | 8— 6 | 8— 9 | 9— 1 | 9— 5 | 9— 8 |
| 2 x 10 | 12 | 12— 0 | 12— 8 | 13— 5 | 14— 0 | 12— 1 | 12— 9 | 13— 5 | 14— 0 | 14— 7 | 15— 1 | 15— 7 | 16— 2 | 16— 8 | 17— 1 |
| | 16 | 10—10 | 11— 7 | 12— 2 | 12— 9 | 10— 6 | 11— 1 | 11— 8 | 12— 2 | 12— 8 | 13— 2 | 13— 7 | 14— 1 | 14— 6 | 14—10 |
| | 24 | 9— 7 | 10— 2 | 10— 8 | 11— 2 | 8— 7 | 9— 1 | 9— 6 | 10— 0 | 10— 5 | 10— 9 | 11— 2 | 11— 6 | 11—10 | 12— 2 |
| 2 x 12 | 12 | 14— 5 | 15— 5 | 16— 2 | 16—10 | 14— 7 | 15— 5 | 16— 1 | 16—10 | 17— 7 | 18— 2 | 18—10 | 19— 6 | 20— 1 | 20— 8 |
| | 16 | 13— 2 | 14— 0 | 14— 9 | 15— 5 | 12— 8 | 13— 5 | 14— 1 | 14— 8 | 15— 4 | 15—10 | 16— 5 | 17— 0 | 17— 6 | 18— 0 |
| | 24 | 11— 7 | 12— 4 | 12—10 | 13— 6 | 10— 5 | 11— 0 | 11— 7 | 12— 1 | 12— 7 | 13— 1 | 13— 6 | 14— 0 | 14— 5 | 14— 9 |
| 2 x 14 | 12 | 16—11 | 18— 0 | 19— 0 | 19—10 | 17— 1 | 18— 0 | 18—11 | 19— 9 | 20— 6 | 21— 4 | 22— 0 | 22—10 | 23— 6 | 24— 3 |
| | 16 | 15— 5 | 16— 5 | 17— 4 | 18— 1 | 14—11 | 15— 9 | 16— 6 | 17— 3 | 17—11 | 18— 7 | 19— 3 | 19—10 | 20— 6 | 21— 1 |
| | 24 | 13— 7 | 14— 5 | 15— 3 | 15—11 | 12— 4 | 12—11 | 13— 7 | 14— 1 | 14—10 | 15— 4 | 15—10 | 16— 5 | 16—11 | 17— 4 |
| 3 x 6 | 12 | 8— 4 | 8—11 | 9— 4 | 9— 9 | 9— 1 | 9— 7 | 10— 1 | 10— 7 | 11— 0 | 11— 5 | 11—10 | 12— 3 | 12— 7 | 12—11 |
| | 16 | 7— 7 | 8— 1 | 8— 6 | 8—11 | 7—11 | 8— 5 | 8—10 | 9— 3 | 9— 7 | 9—11 | 10— 4 | 10— 7 | 11— 0 | 11— 4 |
| | 24 | 6— 9 | 7— 1 | 7— 6 | 7—10 | 6— 7 | 6—11 | 7— 3 | 7— 6 | 7—11 | 8— 3 | 8— 5 | 8— 9 | 9— 0 | 9— 4 |
| 3 x 8 | 12 | 11— 1 | 11—10 | 12— 5 | 12—11 | 12— 1 | 12—10 | 13— 5 | 14— 0 | 14— 9 | 15— 1 | 15— 7 | 16— 3 | 16— 7 | 17— 1 |
| | 16 | 10— 1 | 10—10 | 11— 4 | 11—10 | 10— 7 | 11— 1 | 11— 9 | 12— 3 | 12—10 | 13— 3 | 13— 7 | 14— 1 | 14— 6 | 14—11 |
| | 24 | 8—11 | 9— 5 | 9—11 | 10— 5 | 8— 9 | 9— 3 | 9— 7 | 10— 0 | 10— 6 | 10—10 | 11— 3 | 11— 7 | 11—11 | 12— 4 |
| 3 x 10 | 12 | 14— 0 | 14—10 | 15— 7 | 16— 4 | 15— 3 | 16— 1 | 16—10 | 17— 7 | 18— 4 | 19— 0 | 19— 7 | 20— 4 | 20—11 | 21— 6 |
| | 16 | 12—10 | 13— 6 | 14— 4 | 14—11 | 13— 4 | 14— 0 | 14— 9 | 15— 5 | 16— 0 | 16— 7 | 17— 3 | 17— 9 | 18— 4 | 18—10 |
| | 24 | 11— 3 | 11—11 | 12— 6 | 13— 1 | 11— 0 | 11— 6 | 12— 1 | 12— 7 | 13— 3 | 13— 9 | 14— 1 | 14— 7 | 15— 1 | 15— 6 |
| 3 x 12 | 12 | 16—10 | 17—10 | 18—10 | 19— 9 | 18— 4 | 19— 4 | 20— 3 | 21— 1 | 22— 0 | 22—10 | 23— 7 | 24— 5 | 25— 1 | 25—11 |
| | 16 | 15— 5 | 16— 4 | 17— 3 | 18— 0 | 16— 0 | 16—11 | 17— 9 | 18— 6 | 19— 3 | 20— 0 | 20— 9 | 21— 5 | 22— 0 | 22— 7 |
| | 24 | 13— 6 | 14— 5 | 15— 1 | 15—10 | 13— 3 | 13—11 | 14— 7 | 15— 4 | 15—11 | 16— 6 | 17— 1 | 17— 7 | 18— 3 | 18— 9 |
| 3 x 14 | 12 | 19— 7 | 20—10 | 21—11 | 23— 0 | 21— 4 | 22— 6 | 23— 7 | 24— 7 | 25— 7 | 26— 7 | 27— 6 | 28— 5 | 29— 4 | 30— 0 |
| | 16 | 18— 0 | 19— 1 | 20— 1 | 21— 1 | 18— 9 | 19— 9 | 20— 9 | 21— 7 | 22— 6 | 23— 4 | 24— 1 | 24—11 | 25— 9 | 26— 5 |
| | 24 | 15—10 | 16—10 | 17— 9 | 18— 6 | 15— 6 | 16— 4 | 17— 1 | 17—10 | 18— 7 | 19— 4 | 19—11 | 20— 7 | 21— 3 | 21—11 |
| 4 x 6 | 12 | 9— 4 | 9—10 | 10— 5 | 10—10 | 10— 9 | 11— 4 | 11—10 | 12— 4 | 12—10 | 13— 4 | 13—10 | 14— 3 | 14— 9 | 15— 1 |
| | 16 | 8— 6 | 9— 0 | 9— 5 | 9—11 | 9— 4 | 9—10 | 10— 4 | 10—10 | 11— 3 | 11— 7 | 12— 0 | 12— 5 | 12—10 | 13— 3 |
| | 24 | 7— 5 | 7—11 | 8— 4 | 8— 9 | 7— 9 | 8— 1 | 8— 6 | 8—10 | 9— 3 | 9— 6 | 9—11 | 10— 3 | 10— 6 | 10—10 |
| 4 x 8 | 12 | 12— 3 | 13— 0 | 13— 9 | 14— 4 | 14— 1 | 14—11 | 15— 7 | 16— 4 | 16—11 | 17— 7 | 18— 3 | 18—10 | 19— 5 | 19—11 |
| | 16 | 11— 3 | 11—11 | 12— 6 | 13— 1 | 12— 4 | 13— 0 | 13— 7 | 14— 3 | 14—10 | 15— 5 | 15—11 | 16— 5 | 16—11 | 17— 5 |
| | 24 | 9—10 | 10— 6 | 11— 0 | 11— 6 | 10— 1 | 10— 9 | 11— 3 | 11— 9 | 12— 3 | 12— 9 | 13— 1 | 13— 7 | 14— 0 | 14— 5 |
| 4 x 10 | 12 | 15— 5 | 16— 5 | 17— 4 | 18— 0 | 17— 9 | 18— 7 | 19— 6 | 20— 5 | 21— 4 | 22— 0 | 22—10 | 23— 7 | 24— 4 | 25— 0 |
| | 16 | 14— 1 | 15— 0 | 15—10 | 16— 6 | 15— 6 | 16— 4 | 17— 1 | 17—11 | 18— 7 | 19— 4 | 20— 0 | 20— 9 | 21— 4 | 21—11 |
| | 24 | 12— 5 | 13— 3 | 13—11 | 14— 6 | 12—10 | 13— 6 | 14— 1 | 14—10 | 15— 5 | 16— 0 | 16— 6 | 17— 1 | 17— 7 | 18— 1 |

**NOTE.**—The lengths are based on:

When limited by deflection—
- Maximum allowable deflection of 1/360 of span length.
- Modulus of elasticity as noted for "E."

When determined by bending strength of the piece—
- Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
- Weight of lath and plaster ceiling (10 pounds per square foot).
- Double thickness of flooring (5 pounds per square foot).

Live load—80 pounds per square foot of floor area with plastered ceiling, or
- 90 pounds per square foot with ceiling unplastered.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 80 Pounds per Square Foot with Plastered Ceiling. Live Load 90 Pounds per Square Foot with Unplastered Ceiling

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Spans Limited by Horizontal Shear (Read Carefully)** Having determined by reference to the building code or the table on page 1 the **horizontal shear stress** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine the span limited by the **horizontal shear stress. THEN** refer to the tables on page 8 and in the same manner determine the span of the joist limited by its **bending strength** and **use the shorter of the two spans.** | | | | | | | | | | |
| | | S=70 | S=75 | S=80 | S=85 | S=90 | S=95 | S=100 | S=105 | S=110 | S=120 | S=125 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 8—10 | 9— 5 | 10— 0 | 10— 7 | 11— 2 | 11—10 | 12— 6 | 13— 1 | 13— 8 | 15— 0 | 15— 7 |
| | 16 | 6— 7 | 7— 1 | 7— 6 | 8— 0 | 8— 6 | 9— 0 | 9— 5 | 9—10 | 10— 5 | 11— 4 | 11— 9 |
| 2 x 8 | 12 | 11— 7 | 12— 5 | 13— 2 | 14— 0 | 14—10 | 15— 8 | 16— 6 | 17— 5 | 18— 2 | 19— 9 | 20— 7 |
| | 16 | 8— 9 | 9— 5 | 10— 0 | 10— 7 | 11— 2 | 11—10 | 12— 6 | 13— 1 | 13— 9 | 15— 0 | 15— 7 |
| | 24 | 5—10 | 6— 4 | 6— 8 | 7— 1 | 7— 7 | 8— 0 | 8— 5 | 8— 9 | 9— 2 | 10— 1 | 10— 6 |
| 2 x 10 | 12 | 14— 6 | 15— 6 | 16— 7 | 17— 7 | 18— 8 | 19— 8 | 20— 8 | 21— 9 | 22— 9 | 24—10 | 25—10 |
| | 16 | 11— 0 | 11— 9 | 12— 7 | 13— 5 | 14— 2 | 14—10 | 15— 8 | 16— 6 | 17— 4 | 18—10 | 19— 8 |
| | 24 | 7— 5 | 7—10 | 8— 6 | 9— 0 | 9— 6 | 10— 1 | 10— 7 | 11— 1 | 11— 8 | 12— 8 | 13— 2 |
| 2 x 12 | 12 | 17— 5 | 18— 8 | 19—10 | 21— 1 | 22— 5 | 23— 7 | 24—10 | 26— 1 | 27— 5 | 29— 9 | 30— 0 |
| | 16 | 13— 2 | 14— 2 | 15— 1 | 16— 1 | 17— 0 | 18— 0 | 18—10 | 19—10 | 20— 9 | 22— 8 | 23— 7 |
| | 24 | 8—10 | 9— 7 | 10— 2 | 10—10 | 11— 6 | 12— 1 | 12— 9 | 13— 5 | 14— 0 | 15— 4 | 16— 0 |
| 2 x 14 | 12 | 20— 2 | 21— 7 | 23— 0 | 24— 6 | 25—10 | 27— 5 | 28— 9 | 30— 0 | | | |
| | 16 | 15— 5 | 16— 6 | 17— 7 | 18— 8 | 19— 9 | 20—10 | 22— 0 | 23— 1 | 24— 2 | 26— 5 | 27— 6 |
| | 24 | 10— 5 | 11— 2 | 11—10 | 12— 8 | 13— 5 | 14— 1 | 14—10 | 15— 7 | 16— 5 | 17—10 | 18— 7 |
| 3 x 6 | 12 | 13—10 | 14—10 | 15—10 | 16—10 | 17—10 | 18—10 | 19— 9 | 20— 9 | 21— 9 | 23— 9 | 24— 9 |
| | 16 | 10— 6 | 11— 4 | 12— 0 | 12— 9 | 13— 6 | 14— 4 | 15— 1 | 15— 9 | 16— 7 | 18— 1 | 18— 9 |
| | 24 | 7— 1 | 7— 7 | 8— 1 | 8— 7 | 9— 1 | 9— 7 | 10— 1 | 10— 7 | 11— 2 | 12— 2 | 12— 8 |
| 3 x 8 | 12 | 18— 2 | 19— 7 | 20—10 | 22— 2 | 23— 6 | 24— 9 | 26— 1 | 27— 5 | 28— 8 | 30— 0 | |
| | 16 | 13—10 | 14—10 | 15—10 | 16—10 | 17—10 | 18— 9 | 19— 9 | 20— 9 | 21— 9 | 23— 9 | 24— 9 |
| | 24 | 9— 5 | 10— 1 | 10— 8 | 11— 5 | 12— 1 | 12— 8 | 13— 5 | 14— 1 | 14— 9 | 16— 1 | 16— 9 |
| 3 x 10 | 12 | 22— 9 | 24— 5 | 26— 0 | 27— 8 | 29— 4 | 30— 0 | | | | | |
| | 16 | 17— 5 | 18— 7 | 19—10 | 21— 1 | 22— 5 | 23— 7 | 24— 9 | 26— 1 | 27— 4 | 29— 9 | 30— 0 |
| | 24 | 11— 9 | 12— 7 | 13— 6 | 14— 4 | 15— 2 | 16— 0 | 16—10 | 17— 8 | 18— 6 | 20— 2 | 21— 1 |
| 3 x 12 | 12 | 27— 2 | 29— 1 | 30— 0 | | | | | | | | |
| | 16 | 20— 9 | 22— 4 | 23— 9 | 25— 4 | 26— 9 | 28— 4 | 29— 8 | 30— 0 | | | |
| | 24 | 14— 2 | 15— 2 | 16— 2 | 17— 2 | 18— 2 | 19— 2 | 20— 2 | 21— 4 | 22— 4 | 24— 4 | 25— 4 |
| 3 x 14 | 12 | 30— 0 | | | | | | | | | | |
| | 16 | 24— 2 | 25—10 | 27— 7 | 29— 4 | 30— 0 | | | | | | |
| | 24 | 16— 6 | 17— 8 | 18—10 | 20— 1 | 21— 2 | 22— 5 | 23— 7 | 24— 9 | 26— 0 | 28— 4 | 29— 6 |
| 4 x 6 | 12 | 18—10 | 20— 4 | 21— 7 | 23— 0 | 24— 4 | 25— 8 | 27— 0 | 28— 5 | 29— 8 | 30— 0 | |
| | 16 | 14— 5 | 15— 5 | 16— 5 | 17— 6 | 18— 6 | 19— 6 | 20— 7 | 21— 7 | 22— 7 | 24— 8 | 25— 8 |
| | 24 | 9— 8 | 10— 5 | 11— 1 | 11— 9 | 12— 6 | 13— 2 | 13—10 | 14— 7 | 15— 4 | 16— 8 | 17— 5 |
| 4 x 8 | 12 | 24— 8 | 26— 6 | 28— 2 | 30— 0 | | | | | | | |
| | 16 | 18—10 | 20— 2 | 21— 7 | 22—10 | 24— 4 | 25— 7 | 27— 0 | 28— 4 | 29— 8 | 30— 0 | |
| | 24 | 12— 9 | 13— 8 | 14— 8 | 15— 7 | 16— 6 | 17— 5 | 18— 4 | 19— 2 | 20— 2 | 22— 0 | 22—10 |
| 4 x 10 | 12 | 30— 0 | | | | | | | | | | |
| | 16 | 23— 7 | 25— 2 | 26—10 | 28— 7 | 30— 0 | | | | | | |
| | 24 | 16— 1 | 17— 2 | 18— 5 | 19— 6 | 20— 8 | 21— 9 | 23— 0 | 24— 1 | 25— 4 | 27— 7 | 28— 8 |

NOTE.—The lengths are based on:
Allowable horizontal shear stress as noted for "S."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—80 pounds per square foot of floor area with plastered ceiling, or
90 pounds per square foot with ceiling unplastered.

# MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 90 Pounds per Square Foot with Plastered Ceiling. Live Load 100 Pounds per Square Foot with Unplastered Ceiling.

MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span)

**Limited by Deflection of 1/360 of the Span**

Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span.

**Spans Determined by Bending (Read Carefully)**

Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of timber used, refer to the column below with the corresponding value to determine the span limited by the **bending strength** of the joist. **THEN** refer to the table on page **11** and in the same manner determine the span of the joist limited by **horizontal shear** and **use the shorter of the two spans.**

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 6—10 | 7— 4 | 7— 8 | 8— 1 | 6—10 | 7— 2 | 7— 7 | 8— 0 | 8— 4 | 8— 7 | 8—10 | 9— 2 | 9— 5 | 9— 9 |
| | 16 | 6— 4 | 6— 8 | 7— 0 | 7— 4 | 6— 0 | 6— 4 | 6— 7 | 6—10 | 7— 2 | 7— 6 | 7— 8 | 8— 0 | 8— 2 | 8— 5 |
| 2 x 8 | 12 | 9— 2 | 9— 8 | 10— 4 | 10— 8 | 9— 1 | 9— 8 | 10— 1 | 10— 6 | 11— 0 | 11— 5 | 11— 9 | 12— 2 | 12— 7 | 13— 0 |
| | 16 | 8— 4 | 8—10 | 9— 4 | 9— 9 | 8— 0 | 8— 5 | 8— 9 | 9— 2 | 9— 6 | 9—10 | 10— 4 | 10— 7 | 10—10 | 11— 2 |
| 2 x 10 | 12 | 11— 7 | 12— 4 | 13— 0 | 13— 7 | 11— 6 | 12— 2 | 12— 9 | 13— 4 | 13—10 | 14— 5 | 14—10 | 15— 5 | 15—10 | 16— 4 |
| | 16 | 10— 7 | 11— 2 | 11— 9 | 12— 5 | 10— 1 | 10— 7 | 11— 1 | 11— 7 | 12— 1 | 12— 7 | 13— 0 | 13— 5 | 13— 9 | 14— 2 |
| | 24 | 9— 2 | 9— 9 | 10— 5 | 10— 9 | 8— 2 | 8— 8 | 9— 1 | 9— 6 | 9—10 | 10— 4 | 10— 7 | 11— 0 | 11— 4 | 11— 8 |
| 2 x 12 | 12 | 14— 0 | 14—10 | 15— 8 | 16— 5 | 13—10 | 14— 8 | 15— 5 | 16— 1 | 16— 8 | 17— 5 | 18— 0 | 18— 7 | 19— 1 | 19— 8 |
| | 16 | 12— 9 | 13— 7 | 14— 3 | 14—10 | 12— 1 | 12— 9 | 13— 5 | 14— 0 | 14— 7 | 15— 2 | 15— 8 | 16— 2 | 16— 8 | 17— 2 |
| | 24 | 11— 2 | 11—10 | 12— 6 | 13— 1 | 10— 0 | 10— 6 | 11— 0 | 11— 6 | 12— 0 | 12— 5 | 12— 9 | 13— 4 | 13— 8 | 14— 1 |
| 2 x 14 | 12 | 16— 5 | 17— 6 | 18— 5 | 19— 3 | 16— 4 | 17— 3 | 18— 0 | 18—10 | 19— 7 | 20— 4 | 21— 0 | 21— 9 | 22— 5 | 23— 0 |
| | 16 | 15— 0 | 15—11 | 16—10 | 17— 6 | 14— 3 | 15— 0 | 15— 9 | 16— 5 | 17— 1 | 17— 9 | 18— 5 | 18—11 | 19— 6 | 20— 1 |
| | 24 | 13— 3 | 14— 0 | 14— 9 | 15— 5 | 11— 9 | 12— 4 | 12—11 | 13— 6 | 14— 1 | 14— 7 | 15— 1 | 15— 7 | 16— 1 | 16— 7 |
| 3 x 6 | 12 | 8— 1 | 8— 7 | 9— 0 | 9— 6 | 8— 9 | 9— 3 | 9— 7 | 10— 0 | 10— 6 | 10—11 | 11— 4 | 11— 7 | 12— 0 | 12— 4 |
| | 16 | 7— 5 | 7—10 | 8— 3 | 8— 7 | 7— 7 | 8— 0 | 8— 5 | 8—10 | 9— 1 | 9— 6 | 9—10 | 10— 1 | 10— 5 | 10— 9 |
| 3 x 8 | 12 | 10— 9 | 11— 5 | 12— 0 | 12— 6 | 11— 6 | 12— 3 | 12—10 | 13— 4 | 14— 0 | 14— 5 | 14—11 | 15— 5 | 15—11 | 16— 4 |
| | 16 | 9—10 | 10— 5 | 11— 0 | 11— 6 | 10— 0 | 10— 7 | 11— 1 | 11— 7 | 12— 3 | 12— 7 | 13— 0 | 13— 5 | 13—10 | 14— 3 |
| | 24 | 8— 7 | 9— 1 | 9— 7 | 10— 0 | 8— 3 | 8— 9 | 9— 3 | 9— 6 | 10— 0 | 10— 4 | 10— 9 | 11— 0 | 11— 5 | 11— 9 |
| 3 x 10 | 12 | 13— 6 | 14— 5 | 15— 1 | 15—10 | 14— 6 | 15— 4 | 16— 1 | 16—10 | 17— 6 | 18— 1 | 18—10 | 19— 5 | 20— 0 | 20— 6 |
| | 16 | 12— 5 | 13— 3 | 13—10 | 14— 6 | 12— 9 | 13— 4 | 14— 0 | 14— 9 | 15— 3 | 15—10 | 16— 5 | 16—11 | 17— 5 | 17—11 |
| | 24 | 10—11 | 11— 6 | 12— 1 | 12— 9 | 10— 5 | 11— 0 | 11— 6 | 12— 0 | 12— 7 | 13— 0 | 13— 6 | 13—11 | 14— 5 | 14—10 |
| 3 x 12 | 12 | 16— 4 | 17— 4 | 18— 3 | 19— 1 | 17— 6 | 18— 5 | 19— 4 | 20— 3 | 21— 0 | 21—10 | 22— 6 | 23— 4 | 24— 0 | 24— 9 |
| | 16 | 14—11 | 15—10 | 16— 9 | 17— 3 | 15— 4 | 16— 1 | 16—11 | 17— 7 | 18— 5 | 19— 1 | 19— 9 | 20— 5 | 21— 0 | 21— 7 |
| | 24 | 13— 1 | 13—11 | 14— 7 | 15— 4 | 12— 7 | 13— 4 | 13—11 | 14— 7 | 15— 1 | 15— 9 | 16— 3 | 16—10 | 17— 4 | 17—10 |
| 3 x 14 | 12 | 19— 1 | 20— 3 | 21— 4 | 22— 4 | 20— 5 | 21— 6 | 22— 6 | 23— 6 | 24— 6 | 25— 5 | 26— 4 | 27— 3 | 28— 0 | 28—10 |
| | 16 | 17— 6 | 18— 6 | 19— 6 | 20— 5 | 17—10 | 18—10 | 19— 9 | 20— 7 | 21— 5 | 22— 3 | 23— 0 | 23—10 | 24— 6 | 25— 3 |
| | 24 | 15— 5 | 16— 4 | 17— 3 | 17—11 | 14— 9 | 15— 6 | 16— 4 | 17— 0 | 17— 9 | 18— 5 | 19— 0 | 19— 7 | 20— 3 | 20—10 |
| 4 x 6 | 12 | 9— 0 | 9— 6 | 10— 0 | 10— 6 | 10— 3 | 10— 9 | 11— 4 | 11— 9 | 12— 3 | 12— 9 | 13— 3 | 13— 7 | 14— 0 | 14— 5 |
| | 16 | 8— 3 | 8— 9 | 9— 1 | 9— 7 | 8—11 | 9— 4 | 9—10 | 10— 3 | 10— 9 | 11— 0 | 11— 5 | 11—10 | 12— 2 | 12— 6 |
| | 24 | 7— 3 | 7— 7 | 8— 0 | 8— 5 | 7— 4 | 7— 9 | 8— 1 | 8— 5 | 8—10 | 9— 1 | 9— 5 | 9— 9 | 10— 0 | 10— 4 |
| 4 x 8 | 12 | 11—11 | 12— 7 | 13— 4 | 13—11 | 13— 6 | 14— 3 | 14—11 | 15— 7 | 16— 3 | 16—10 | 17— 5 | 17—11 | 18— 6 | 19— 0 |
| | 16 | 10—10 | 11— 6 | 12— 1 | 12— 9 | 11— 9 | 12— 5 | 13— 0 | 13— 7 | 14— 1 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 7 |
| | 24 | 9— 6 | 10— 1 | 10— 9 | 11— 1 | 9— 9 | 10— 3 | 10— 9 | 11— 3 | 11— 7 | 12— 1 | 12— 6 | 12—11 | 13— 4 | 13— 9 |
| 4 x 10 | 12 | 15— 0 | 15—11 | 16— 9 | 17— 6 | 16—11 | 17—10 | 18— 9 | 19— 6 | 20— 4 | 21— 1 | 21—10 | 22— 6 | 23— 3 | 23—11 |
| | 16 | 13— 9 | 14— 6 | 15— 4 | 16— 1 | 14—10 | 15— 7 | 16— 4 | 17— 1 | 17—10 | 18— 5 | 19— 1 | 19— 9 | 20— 4 | 20—11 |
| | 24 | 12— 0 | 12—10 | 13— 6 | 14— 0 | 12— 3 | 12—11 | 13— 6 | 14— 1 | 14— 9 | 15— 3 | 15— 9 | 16— 4 | 16—10 | 17— 4 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—90 pounds per square foot of floor area with plastered ceiling, or
100 pounds per square foot with ceiling unplastered.

*These spans MUST be Compared and Checked with those on page Ten*

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 90 Pounds per Square Foot with Plastered Ceiling. Live Load 100 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Spans Limited by Horizontal Shear (Read Carefully)** Having determined by reference to the building code or the table on page 1 the **horizontal shear stress** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine the span limited by the **horizontal shear stress. THEN** refer to the tables on page 10 and in the same manner determine the span of the joist limited by its **bending strength** and use the shorter of the two spans. | | | | | | | | | | |
| | | S=70 | S=75 | S=80 | S=85 | S=90 | S=95 | S=100 | S=105 | S=110 | S=120 | S=125 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 7—10 | 8— 6 | 9— 1 | 9— 7 | 10— 2 | 10— 9 | 11— 4 | 11—10 | 12— 6 | 13— 7 | 14— 2 |
| | 16 | 6— 0 | 6— 5 | 6— 9 | 7— 4 | 7— 8 | 8— 1 | 8— 6 | 9— 0 | 9— 5 | 10— 4 | 10— 8 |
| 2 x 8 | 12 | 10— 6 | 11— 2 | 12— 0 | 12— 8 | 13— 6 | 14— 2 | 15— 0 | 15— 8 | 16— 6 | 18— 0 | 18— 8 |
| | 16 | 7—10 | 8— 6 | 9— 1 | 9— 7 | 10— 2 | 10— 9 | 11— 4 | 11—10 | 12— 6 | 13— 7 | 14— 2 |
| 2 x 10 | 12 | 13— 2 | 14— 1 | 15— 1 | 16— 0 | 17— 0 | 17—10 | 18— 9 | 19— 5 | 20— 8 | 22— 7 | 23— 6 |
| | 16 | 10— 0 | 10— 8 | 11— 5 | 12— 1 | 12— 9 | 13— 7 | 14— 4 | 15— 0 | 15— 8 | 17— 1 | 17— 9 |
| | 24 | 6— 8 | 7— 2 | 7— 8 | 8— 2 | 8— 7 | 9— 1 | 9— 7 | 10— 1 | 10— 7 | 11— 6 | 12— 0 |
| 2 x 12 | 12 | 15— 9 | 17— 0 | 18— 1 | 19— 2 | 20— 5 | 21— 6 | 22— 7 | 23— 9 | 24—10 | 27— 1 | 28— 4 |
| | 16 | 12— 0 | 12—10 | 13— 8 | 14— 7 | 15— 5 | 16— 4 | 17— 2 | 18— 0 | 18—10 | 20— 7 | 21— 6 |
| | 24 | 8— 1 | 8— 8 | 9— 4 | 9— 9 | 10— 5 | 11— 0 | 11— 7 | 12— 2 | 12— 8 | 13—10 | 14— 6 |
| 2 x 14 | 12 | 18— 5 | 19— 8 | 21— 0 | 22— 4 | 23— 7 | 24—10 | 26— 2 | 27— 6 | 28— 9 | 30— 0 | |
| | 16 | 14— 0 | 15— 0 | 16— 0 | 17— 0 | 18— 0 | 19— 0 | 20— 0 | 21— 0 | 22— 0 | 24— 0 | 25— 0 |
| | 24 | 9— 6 | 10— 1 | 10— 9 | 11— 6 | 12— 2 | 12— 9 | 13— 6 | 14— 2 | 14—10 | 16— 2 | 16—10 |
| 3 x 6 | 12 | 12— 7 | 13— 6 | 14— 5 | 15— 4 | 16— 2 | 17— 1 | 18— 0 | 18—10 | 19— 9 | 21— 7 | 22— 6 |
| | 16 | 9— 7 | 10— 2 | 10—10 | 11— 7 | 12— 4 | 13— 0 | 13— 8 | 14— 4 | 15— 0 | 16— 5 | 17— 1 |
| 3 x 8 | 12 | 16— 7 | 17— 9 | 19— 0 | 20— 2 | 21— 4 | 22— 6 | 23— 8 | 24—10 | 26— 1 | 28— 6 | 29— 7 |
| | 16 | 12— 7 | 13— 6 | 14— 5 | 15— 4 | 16— 2 | 17— 1 | 18— 0 | 18—10 | 19— 9 | 21— 7 | 22— 6 |
| | 24 | 8— 6 | 9— 1 | 9— 8 | 10— 5 | 11— 0 | 11— 7 | 12— 2 | 12— 9 | 13— 5 | 14— 7 | 15— 2 |
| 3 x 10 | 12 | 20— 8 | 22— 2 | 23— 8 | 25— 2 | 26— 8 | 28— 1 | 29— 7 | 30— 0 | | | |
| | 16 | 15— 9 | 16—10 | 18— 1 | 19— 2 | 20— 4 | 21— 6 | 22— 7 | 23— 8 | 24— 9 | 27— 1 | 28— 2 |
| | 24 | 10— 8 | 11— 6 | 12— 2 | 13— 0 | 13— 9 | 14— 6 | 15— 4 | 16— 1 | 16— 9 | 18— 5 | 19— 1 |
| 3 x 12 | 12 | 24— 9 | 26— 6 | 28— 4 | 30— 0 | | | | | | | |
| | 16 | 18—10 | 20— 4 | 21— 7 | 23— 0 | 24— 5 | 25— 8 | 27— 1 | 28— 5 | 29— 9 | 30— 0 | |
| | 24 | 12—10 | 13— 9 | 14— 8 | 15— 7 | 16— 7 | 17— 6 | 18— 5 | 19— 4 | 20— 2 | 22— 1 | 23— 0 |
| 3 x 14 | 12 | 28— 8 | 30— 0 | | | | | | | | | |
| | 16 | 22— 0 | 23— 7 | 25— 2 | 26— 8 | 28— 4 | 29—10 | 30— 0 | | | | |
| | 24 | 15— 0 | 16— 1 | 17— 2 | 18— 2 | 19— 4 | 20— 5 | 21— 6 | 22— 6 | 23— 7 | 25— 8 | 26— 9 |
| 4 x 6 | 12 | 17— 2 | 18— 5 | 19— 8 | 20—10 | 22— 1 | 23— 4 | 24— 7 | 25— 9 | 27— 0 | 29— 6 | 30— 0 |
| | 16 | 13— 1 | 14— 0 | 14—10 | 15—10 | 16— 9 | 17— 8 | 18— 8 | 19— 7 | 20— 6 | 22— 5 | 23— 4 |
| | 24 | 8— 9 | 9— 6 | 10— 1 | 10— 8 | 11— 4 | 12— 0 | 12— 7 | 13— 2 | 13—10 | 15— 1 | 15— 9 |
| 4 x 8 | 12 | 22— 6 | 24— 1 | 25— 8 | 27— 4 | 28—10 | 30— 0 | | | | | |
| | 16 | 17— 2 | 18— 5 | 19— 7 | 20—10 | 22— 1 | 23— 4 | 24— 6 | 25— 9 | 27— 0 | 29— 5 | 30— 0 |
| | 24 | 11— 8 | 12— 6 | 13— 4 | 14— 1 | 15— 0 | 15— 9 | 16— 7 | 17— 6 | 18— 4 | 20— 0 | 20— 9 |
| 4 x 10 | 12 | 28— 0 | 30— 0 | | | | | | | | | |
| | 16 | 21— 5 | 23— 0 | 24— 6 | 26— 0 | 27— 7 | 29— 1 | 30— 0 | | | | |
| | 24 | 14— 7 | 15— 8 | 16— 8 | 17— 9 | 18— 9 | 19— 9 | 20—10 | 21—10 | 23— 0 | 25— 1 | 26— 1 |

NOTE.—The lengths are based on:
Allowable horizontal shear stress as noted for "S."
Dead load—Weieght of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—90 pounds per square foot of floor area with plastered ceiling, or 100 pounds per square foot with ceiling unplastered.

These spans MUST be Compared and Checked with those on page Thirteen





## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 100 Pounds per Square Foot with Plastered Ceiling. Live Load 110 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Spans Determined by Bending (Read Carefully)** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of timber used, refer to the column below with the corresponding value to determine the span limited by the **bending strength** of the joist. **THEN** refer to the table on page 13 and in the same manner determine the span of the joist limited by **horizontal shear** and **use the shorter of the two spans.** | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 8—10 | 9— 5 | 10— 0 | 10— 5 | 8— 8 | 9— 2 | 9— 7 | 10— 1 | 10— 6 | 10—10 | 11— 4 | 11— 8 | 12— 0 | 12— 5 |
| | 16 | 8— 1 | 8— 7 | 9— 1 | 9— 6 | 7— 7 | 8— 0 | 8— 5 | 8— 9 | 9— 1 | 9— 6 | 9— 9 | 10— 1 | 10— 5 | 10— 9 |
| 2 x 10 | 12 | 11— 2 | 12— 0 | 12— 7 | 13— 2 | 11— 0 | 11— 8 | 12— 2 | 12— 9 | 13— 4 | 13— 9 | 14— 4 | 14— 8 | 15— 2 | 15— 7 |
| | 16 | 10— 2 | 10—10 | 11— 6 | 12— 0 | 9— 7 | 10— 1 | 10— 7 | 11— 1 | 11— 6 | 12— 0 | 12— 5 | 12— 9 | 13— 2 | 13— 7 |
| | 24 | 9— 0 | 9— 6 | 10— 0 | 10— 6 | 7—10 | 8— 4 | 8— 8 | 9— 1 | 9— 5 | 9— 9 | 10— 1 | 10— 6 | 10— 9 | 11— 1 |
| 2 x 12 | 12 | 13— 7 | 14— 5 | 15— 2 | 15—10 | 13— 4 | 14— 1 | 14— 8 | 15— 5 | 16— 0 | 16— 7 | 17— 2 | 17— 9 | 18— 4 | 18—10 |
| | 16 | 12— 5 | 13— 2 | 13—10 | 14— 6 | 11— 7 | 12— 2 | 12— 9 | 13— 5 | 14— 0 | 14— 6 | 15— 0 | 15— 6 | 16— 0 | 16— 5 |
| | 24 | 10—10 | 11— 6 | 12— 2 | 12— 8 | 9— 6 | 10— 1 | 10— 6 | 11— 0 | 11— 5 | 11—10 | 12— 4 | 12— 8 | 13— 1 | 13— 6 |
| 2 x 14 | 12 | 16— 0 | 16—11 | 17—10 | 18— 9 | 15— 7 | 16— 6 | 17— 4 | 18— 0 | 18—10 | 19— 6 | 20— 1 | 20—10 | 21— 5 | 22— 1 |
| | 16 | 14— 6 | 15— 6 | 16— 4 | 17— 0 | 13— 7 | 14— 5 | 15— 1 | 15— 9 | 16— 5 | 17— 0 | 17— 7 | 18— 1 | 18— 9 | 19— 4 |
| | 24 | 12—10 | 13— 7 | 14— 4 | 14—11 | 11— 3 | 11—10 | 12— 5 | 12—10 | 13— 6 | 14— 0 | 14— 6 | 14—11 | 15— 5 | 15—10 |
| 3 x 6 | 12 | 7—11 | 8— 4 | 8—10 | 9— 3 | 8— 5 | 8—10 | 9— 3 | 9— 7 | 10— 0 | 10— 5 | 10—10 | 11— 1 | 11— 6 | 11—10 |
| | 16 | 7— 3 | 7— 7 | 8— 0 | 8— 5 | 7— 3 | 7— 9 | 8— 0 | 8— 5 | 8— 9 | 9— 1 | 9— 5 | 9— 9 | 10— 0 | 10— 3 |
| 3 x 8 | 12 | 10— 6 | 11— 1 | 11— 7 | 12— 3 | 11— 0 | 11— 9 | 12— 3 | 12—10 | 13— 5 | 13—10 | 14— 4 | 14— 9 | 15— 3 | 15— 9 |
| | 16 | 9— 6 | 10— 1 | 10— 9 | 11— 1 | 9— 7 | 10— 1 | 10— 7 | 11— 1 | 11— 9 | 12— 0 | 12— 5 | 12—10 | 13— 3 | 13— 7 |
| | 24 | 8— 4 | 8—11 | 9— 4 | 9— 9 | 7—11 | 8— 5 | 8—10 | 9— 3 | 9— 7 | 9—10 | 10— 3 | 10— 6 | 10—11 | 11— 3 |
| 3 x 10 | 12 | 13— 3 | 14— 0 | 14— 9 | 15— 5 | 13—11 | 14— 9 | 15— 5 | 16— 1 | 16— 9 | 17— 5 | 18— 0 | 18— 7 | 19— 1 | 19— 9 |
| | 16 | 12— 0 | 12— 9 | 13— 5 | 14— 0 | 12— 3 | 12—10 | 13— 3 | 14— 0 | 14— 7 | 15— 3 | 15— 9 | 16— 3 | 16— 9 | 17— 3 |
| | 24 | 10— 6 | 11— 3 | 11—10 | 12— 4 | 10— 0 | 10— 6 | 11— 0 | 11— 7 | 12— 0 | 12— 5 | 12—11 | 13— 4 | 13— 9 | 14— 1 |
| 3 x 12 | 12 | 15—10 | 16—10 | 17— 9 | 18— 6 | 16— 9 | 17— 9 | 18— 6 | 19— 4 | 20— 1 | 20—11 | 21— 7 | 22— 4 | 23— 0 | 23— 9 |
| | 16 | 14— 6 | 15— 5 | 16— 3 | 16—11 | 14— 7 | 15— 5 | 16— 3 | 16—11 | 17— 7 | 18— 3 | 18—11 | 19— 6 | 20— 1 | 20— 9 |
| | 24 | 12— 9 | 13— 6 | 14— 3 | 14—11 | 12— 0 | 12— 9 | 13— 4 | 13—11 | 13— 6 | 15— 0 | 15— 7 | 16— 1 | 16— 7 | 17— 1 |
| 3 x 14 | 12 | 18— 6 | 19— 9 | 20— 9 | 21— 9 | 19— 6 | 20— 7 | 21— 7 | 22— 7 | 23— 6 | 24— 5 | 25— 3 | 26— 1 | 26—11 | 27— 7 |
| | 16 | 16—11 | 18— 0 | 19— 0 | 19—10 | 17— 1 | 18— 0 | 18—11 | 19— 9 | 20— 6 | 21— 4 | 22— 1 | 22—10 | 23— 6 | 24— 3 |
| | 24 | 14—11 | 15—10 | 16— 9 | 17— 6 | 14— 1 | 14—11 | 15— 7 | 16— 4 | 17— 0 | 17— 7 | 18— 3 | 18—10 | 19— 5 | 19—11 |
| 4 x 6 | 12 | 8— 9 | 9— 4 | 9— 9 | 10— 3 | 9— 9 | 10— 4 | 10—10 | 11— 4 | 11— 9 | 12— 3 | 12— 7 | 13— 0 | 13— 5 | 13—10 |
| | 16 | 8— 0 | 8— 5 | 8—11 | 9— 4 | 8— 6 | 8—11 | 9— 5 | 9—10 | 10— 3 | 10— 7 | 11— 0 | 11— 4 | 11— 9 | 12— 0 |
| | 24 | 7— 0 | 7— 5 | 7—10 | 8— 1 | 7— 0 | 7— 4 | 7— 9 | 8— 1 | 8— 5 | 8— 9 | 9— 0 | 9— 4 | 9— 7 | 9—10 |
| 4 x 8 | 12 | 11— 6 | 12— 3 | 12—11 | 13— 6 | 12—11 | 13— 7 | 14— 3 | 14—11 | 15— 6 | 16— 1 | 16— 7 | 17— 3 | 17— 9 | 18— 3 |
| | 16 | 10— 6 | 11— 3 | 11—10 | 12— 4 | 11— 4 | 11—11 | 12— 5 | 13— 0 | 13— 6 | 14— 0 | 14— 6 | 15— 0 | 15— 6 | 15—11 |
| | 24 | 9— 4 | 9—10 | 10— 5 | 10—10 | 9— 4 | 9— 9 | 10— 3 | 10— 9 | 11— 1 | 11— 7 | 12— 0 | 12— 5 | 12— 9 | 13— 1 |
| 4 x 10 | 12 | 14— 6 | 15— 5 | 16— 4 | 17— 0 | 16— 3 | 17— 1 | 17—11 | 18— 9 | 19— 6 | 20— 3 | 20—11 | 21— 7 | 22— 4 | 22—11 |
| | 16 | 13— 4 | 14— 1 | 14—11 | 15— 7 | 14— 3 | 14—11 | 15— 9 | 16— 5 | 17— 0 | 17— 9 | 18— 4 | 18—11 | 19— 6 | 20— 0 |
| | 24 | 11— 9 | 12— 5 | 13— 1 | 13— 9 | 11— 9 | 12— 4 | 12—11 | 13— 6 | 14— 0 | 14— 7 | 15— 1 | 15— 7 | 16— 1 | 16— 6 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—100 pounds per square foot of floor area with plastered ceiling, or 110 pounds per square foot with ceiling unplastered.

*These spans MUST be Compared and Checked with those on page Twelve*

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load **100** Pounds per Square Foot with Plastered Ceiling. Live Load **110** Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Spans Limited by Horizontal Shear (Read Carefully)** Having determined by reference to the building code or the table on page 1 the **horizontal shear stress** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine the **span limited by the horizontal shear stress. THEN** refer to the tables on page 12 and in the same manner determine the span of the joist limited by its **bending strength** and use the **shorter of the two spans.** | | | | | | | | | | |
| | | **S=70** | **S=75** | **S=80** | **S=85** | **S=90** | **S=95** | **S=100** | **S=105** | **S=110** | **S=120** | **S=125** |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 9— 7 | 10— 4 | 11— 0 | 11— 8 | 12— 5 | 13— 0 | 13— 8 | 14— 5 | 15— 1 | 16— 6 | 17— 2 |
| | 16 | 7— 4 | 7— 9 | 8— 4 | 8— 9 | 9— 4 | 9—10 | 10— 5 | 10—10 | 11— 5 | 12— 5 | 13— 0 |
| 2 x 10 | 12 | 12— 1 | 12—10 | 13— 9 | 14— 8 | 15— 6 | 16— 5 | 17— 4 | 18— 1 | 19— 0 | 20— 8 | 21— 7 |
| | 16 | 9— 1 | 9— 9 | 10— 6 | 11— 1 | 11— 9 | 12— 5 | 13— 1 | 13— 8 | 14— 5 | 15— 8 | 16— 4 |
| | 24 | 6— 2 | 6— 7 | 7— 0 | 7— 6 | 7—10 | 8— 4 | 8— 9 | 9— 2 | 9— 8 | 10— 6 | 11— 0 |
| 2 x 12 | 12 | 14— 6 | 15— 7 | 16— 7 | 17— 7 | 18— 8 | 19— 8 | 20— 8 | 21— 9 | 22— 9 | 24—10 | 25—10 |
| | 16 | 11— 0 | 11— 9 | 12— 7 | 13— 5 | 14— 2 | 14—10 | 15— 8 | 16— 6 | 17— 4 | 18—10 | 19— 8 |
| | 24 | 7— 5 | 7—10 | 8— 6 | 9— 0 | 9— 6 | 10— 1 | 10— 7 | 11— 1 | 11— 8 | 12— 8 | 13— 2 |
| 2 x 14 | 12 | 16— 9 | 18— 1 | 19— 4 | 20— 6 | 21— 8 | 22—10 | 24— 1 | 25— 4 | 26— 6 | 28—10 | 30— 0 |
| | 16 | 12— 9 | 13— 8 | 14— 7 | 15— 7 | 16— 6 | 17— 5 | 18— 4 | 19— 2 | 20— 1 | 22— 0 | 22—10 |
| | 24 | 8— 8 | 9— 4 | 9—10 | 10— 6 | 11— 1 | 11— 8 | 12— 5 | 13— 0 | 13— 7 | 14— 9 | 15— 6 |
| 3 x 6 | 12 | 11— 7 | 12— 5 | 13— 2 | 14— 0 | 14—10 | 15— 8 | 16— 6 | 17— 4 | 18— 2 | 19— 9 | 20— 8 |
| | 16 | 8— 9 | 9— 5 | 10— 0 | 10— 7 | 11— 4 | 11—10 | 12— 6 | 13— 1 | 13— 9 | 15— 0 | 15— 7 |
| 3 x 8 | 12 | 15— 2 | 16— 4 | 17— 5 | 18— 6 | 19— 7 | 20— 8 | 21— 8 | 22— 9 | 23—10 | 26— 1 | 27— 2 |
| | 16 | 11— 7 | 12— 5 | 13— 2 | 14— 0 | 14—10 | 15— 8 | 16— 6 | 17— 4 | 18— 2 | 19— 9 | 20— 7 |
| | 24 | 7— 9 | 8— 5 | 8—10 | 9— 6 | 10— 0 | 10— 7 | 11— 1 | 11— 8 | 12— 4 | 13— 5 | 13—10 |
| 3 x 10 | 12 | 19— 0 | 20— 5 | 21— 9 | 23— 1 | 24— 6 | 25— 9 | 27— 2 | 28— 7 | 29—10 | 30— 0 | |
| | 16 | 14— 6 | 15— 6 | 16— 7 | 17— 7 | 18— 7 | 19— 8 | 20— 8 | 21— 9 | 22— 9 | 24—10 | 25—10 |
| | 24 | 9— 9 | 10— 6 | 11— 2 | 11—10 | 12— 7 | 13— 4 | 14— 0 | 14— 8 | 15— 5 | 16— 9 | 17— 6 |
| 3 x 12 | 12 | 22— 9 | 24— 5 | 26— 0 | 27— 7 | 29— 4 | 30— 0 | | | | | |
| | 16 | 17— 5 | 18— 7 | 19—10 | 21— 7 | 22— 5 | 23— 7 | 24— 9 | 26— 1 | 27— 4 | 29— 9 | 31— 1 |
| | 24 | 11— 9 | 12— 7 | 13— 6 | 14— 4 | 15— 2 | 16— 0 | 16—10 | 17— 8 | 18— 6 | 20— 2 | 21— 1 |
| 3 x 14 | 12 | 26— 5 | 28— 4 | 30— 0 | | | | | | | | |
| | 16 | 20— 2 | 21— 8 | 23— 1 | 24— 7 | 26— 0 | 27— 5 | 28—10 | 30— 0 | | | |
| | 24 | 13— 9 | 14— 9 | 15— 8 | 16— 8 | 17— 8 | 18— 8 | 19— 8 | 20— 8 | 21— 7 | 23— 7 | 24— 7 |
| 4 x 6 | 12 | 15— 9 | 16—10 | 18— 0 | 19— 2 | 20— 4 | 21— 5 | 22— 6 | 23— 8 | 24— 9 | 27— 0 | 28— 2 |
| | 16 | 12— 0 | 12— 9 | 13— 8 | 14— 6 | 15— 5 | 16— 2 | 17— 1 | 18— 0 | 18— 9 | 20— 6 | 21— 5 |
| | 24 | 8— 1 | 8— 8 | 9— 2 | 9— 9 | 10— 5 | 11— 0 | 11—6 | 12— 1 | 12— 8 | 13— 9 | 14— 5 |
| 4 x 8 | 12 | 20— 8 | 22— 1 | 23— 7 | 25— 1 | 26— 7 | 28— 0 | 29— 6 | 30— 0 | | | |
| | 16 | 15— 9 | 16—10 | 18— 0 | 19— 1 | 20— 4 | 21— 5 | 22— 6 | 23— 7 | 24— 9 | 27— 0 | 28— 1 |
| | 24 | 10— 8 | 11— 5 | 12— 2 | 13— 0 | 13— 8 | 14— 6 | 15— 2 | 16— 0 | 16— 9 | 18— 4 | 19— 1 |
| 4 x 10 | 12 | 25— 8 | 27— 7 | 29— 5 | 30— 0 | | | | | | | |
| | 16 | 19— 8 | 21— 1 | 22— 6 | 23—10 | 25— 4 | 26— 8 | 28— 1 | 29— 7 | 30— 0 | | |
| | 24 | 13— 5 | 14— 5 | 15— 4 | 16— 4 | 17— 2 | 18— 2 | 19— 1 | 20— 1 | 21— 1 | 23— 0 | 23—10 |

NOTE.—The lengths are based on:
Allowable horizontal shear stress as noted for "S."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—100 pounds per square foot of floor area with plastered ceiling, or 110 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 125 Pounds per Square Foot with Plastered Ceiling. Live Load 135 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable modulus of elasticity in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Spans Determined by Bending (Read Carefully)** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of timber used, refer to the column below with the corresponding value to determine the span limited by the **bending strength** of the joist. **THEN** refer to the table on page 15 and in the same manner determine the span of the joist limited by **horizontal shear** and **use the shorter of the two spans.** | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 8— 4 | 8—10 | 9— 4 | 9— 9 | 8— 0 | 8— 5 | 8— 9 | 9— 2 | 9— 6 | 9—10 | 10— 2 | 10— 7 | 10—10 | 11— 2 |
| | 16 | 7— 7 | 8— 1 | 8— 6 | 9— 0 | 6—10 | 7— 2 | 7— 7 | 8— 0 | 8— 4 | 8— 7 | 8—10 | 9— 2 | 9— 6 | 9— 9 |
| 2 x 10 | 12 | 10— 7 | 11— 2 | 11— 9 | 12— 5 | 10— 1 | 10— 7 | 11— 1 | 11— 7 | 12— 1 | 12— 7 | 13— 0 | 13— 5 | 13— 9 | 14— 2 |
| | 16 | 9— 7 | 10— 6 | 10— 9 | 11— 4 | 8— 8 | 9— 2 | 9— 8 | 10— 1 | 10— 6 | 10—10 | 11— 4 | 11— 8 | 12— 0 | 12— 5 |
| 2 x 12 | 12 | 12— 9 | 13— 7 | 14— 4 | 14—10 | 12— 1 | 12— 9 | 13— 5 | 14— 0 | 14— 7 | 15— 2 | 15— 8 | 16— 2 | 16— 8 | 17— 2 |
| | 16 | 11— 7 | 12— 5 | 13— 0 | 13— 7 | 10— 6 | 11— 1 | 11— 8 | 12— 2 | 12— 8 | 13— 2 | 13— 7 | 14— 1 | 14— 6 | 14—10 |
| 2 x 14 | 12 | 15— 0 | 15—11 | 16—10 | 17— 6 | 14— 3 | 15— 0 | 15— 9 | 16— 5 | 17— 1 | 17— 9 | 18— 5 | 18—11 | 19— 6 | 20— 1 |
| | 16 | 13— 9 | 14— 6 | 15— 4 | 16— 0 | 12— 5 | 13— 0 | 13— 9 | 14— 4 | 14—11 | 15— 6 | 16— 0 | 16— 6 | 17— 0 | 17— 6 |
| | 24 | 12— 0 | 12—10 | 13— 5 | 14— 1 | 10— 1 | 10— 9 | 11— 3 | 11— 9 | 12— 3 | 12— 9 | 13— 1 | 13— 7 | 14— 0 | 14— 5 |
| 3 x 6 | 12 | 7— 5 | 7—10 | 8— 3 | 8— 7 | 7— 6 | 8— 0 | 8— 5 | 8—10 | 9— 1 | 9— 6 | 9—10 | 10— 1 | 10— 5 | 10— 9 |
| | 16 | 6— 9 | 7— 1 | 7— 6 | 7—10 | 6— 7 | 6—11 | 7— 4 | 7— 7 | 7—11 | 8— 3 | 8— 6 | 8—10 | 9— 1 | 9— 4 |
| 3 x 8 | 12 | 9—10 | 10— 5 | 11— 0 | 11— 6 | 10— 0 | 10— 7 | 11— 1 | 11— 7 | 12— 2 | 12— 7 | 13— 0 | 13— 5 | 13—10 | 14— 3 |
| | 16 | 8—11 | 9— 6 | 10— 0 | 10— 5 | 8—10 | 9— 3 | 9— 9 | 10— 1 | 10— 7 | 10—11 | 11— 4 | 11— 9 | 12— 0 | 12— 5 |
| | 24 | 7—10 | 8— 4 | 8—10 | 9— 3 | 7— 3 | 7— 6 | 7— 6 | 8— 4 | 8— 9 | 9— 0 | 9— 4 | 9— 7 | 9—11 | 10— 1 |
| 3 x 10 | 12 | 12— 5 | 13— 1 | 13—10 | 14— 6 | 12— 9 | 13— 4 | 14— 0 | 14— 9 | 15— 3 | 15—10 | 16— 5 | 16—11 | 17— 5 | 17—11 |
| | 16 | 11— 4 | 12— 0 | 12— 7 | 13— 3 | 11— 0 | 11— 9 | 12— 3 | 12—10 | 13— 4 | 13—10 | 14— 4 | 14— 9 | 15— 3 | 15— 7 |
| | 24 | 9—11 | 10— 6 | 11— 1 | 11— 7 | 9— 1 | 9— 7 | 10— 0 | 10— 6 | 10—11 | 11— 4 | 11— 9 | 12— 1 | 12— 6 | 12—10 |
| 3 x 12 | 12 | 14—11 | 15—10 | 16— 9 | 17— 6 | 15— 4 | 16— 1 | 16—11 | 17— 7 | 18— 5 | 19— 1 | 19— 9 | 20— 5 | 21— 0 | 21— 7 |
| | 16 | 13— 7 | 14— 6 | 15— 3 | 15—11 | 13— 4 | 14— 0 | 14— 9 | 15— 5 | 16— 0 | 16— 7 | 17— 3 | 17—10 | 18— 4 | 18—10 |
| | 24 | 12— 0 | 12— 9 | 13— 5 | 14— 0 | 11— 0 | 11— 7 | 12— 1 | 12— 7 | 13— 3 | 13— 9 | 14— 1 | 14— 7 | 15— 1 | 15— 6 |
| 3 x 14 | 12 | 17— 6 | 18— 6 | 19— 6 | 20— 5 | 17—10 | 18—10 | 19— 9 | 20— 7 | 21— 5 | 22— 3 | 23— 0 | 23—10 | 24— 6 | 25— 3 |
| | 16 | 15—11 | 16—11 | 17—10 | 18— 7 | 15— 7 | 16— 5 | 17— 3 | 18— 0 | 18— 9 | 19— 5 | 20— 1 | 20—10 | 21— 5 | 22— 0 |
| | 24 | 14— 0 | 14—10 | 15— 9 | 16— 4 | 12—10 | 13— 6 | 14— 3 | 14—10 | 15— 5 | 16— 0 | 16— 7 | 17— 1 | 17— 7 | 18— 3 |
| 4 x 6 | 12 | 8— 3 | 8— 9 | 9— 1 | 9— 7 | 8—11 | 9— 4 | 9—10 | 10— 3 | 10— 9 | 11— 0 | 11— 5 | 11—10 | 12— 3 | 12— 6 |
| | 16 | 7— 5 | 7—11 | 8— 4 | 8— 9 | 7— 9 | 8— 1 | 8— 6 | 8—11 | 9— 4 | 9— 7 | 9—11 | 10— 4 | 10— 7 | 10—11 |
| | 24 | 6— 6 | 7— 0 | 7— 4 | 7— 7 | 6— 4 | 6— 9 | 7— 0 | 7— 4 | 7— 7 | 7—11 | 8— 3 | 8— 5 | 8— 9 | 8—11 |
| 4 x 8 | 12 | 10—11 | 11— 6 | 12— 3 | 12— 9 | 11— 9 | 12— 5 | 13— 0 | 13— 7 | 14— 1 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 7 |
| | 16 | 9—11 | 10— 6 | 11— 1 | 11— 7 | 10— 3 | 10—10 | 11— 4 | 11—10 | 12— 4 | 12—10 | 13— 3 | 13— 9 | 14— 1 | 14— 6 |
| | 24 | 8— 9 | 9— 3 | 9— 9 | 10— 3 | 8— 5 | 8—11 | 9— 4 | 9— 9 | 10— 1 | 10— 6 | 10—11 | 11— 3 | 11— 7 | 11—11 |
| 4 x 10 | 12 | 13— 9 | 14— 7 | 15— 4 | 16— 0 | 14—10 | 15— 7 | 16— 4 | 17— 1 | 17—10 | 18— 5 | 19— 1 | 19— 9 | 20— 4 | 20—11 |
| | 16 | 12— 6 | 13— 4 | 14— 0 | 14— 7 | 12—11 | 13— 7 | 14— 4 | 14—11 | 15— 6 | 16— 1 | 16— 9 | 17— 3 | 17— 9 | 18— 3 |
| | 24 | 11— 0 | 11— 9 | 12— 4 | 12—11 | 10— 7 | 11— 3 | 11— 9 | 12— 4 | 12—10 | 13— 4 | 13— 9 | 14— 1 | 14— 7 | 15— 0 |

**NOTE.**—The lengths are based on:

When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."

When determined by bending strength of the piece—
Allowable stress in extreme fiber in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).

Live load—125 pounds per square foot of floor area with plastered ceiling, or
135 pounds per square foot with ceiling unplastered.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

**Live Load 125 Pounds per Square Foot with Plastered Ceiling. Live Load 135 Pounds per Square Foot with Unplastered Ceiling.**

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Spans Limited by Horizontal Shear (Read Carefully)** Having determined by reference to the building code or the table on page 1 the **horizontal shear stress** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine the span limited by the **horizontal shear stress. THEN** refer to the tables on page **14** and in the **same manner** determine the span of the joist limited by its **bending strength** and **use the shorter of the two spans.** | | | | | | | | | | |
| | | S=70 | S=75 | S=80 | S=85 | S=90 | S=95 | S=100 | S=105 | S=110 | S=120 | S=125 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 7—10 | 8— 6 | 9— 1 | 9— 7 | 10— 2 | 10— 9 | 11— 4 | 11—10 | 12— 6 | 13— 7 | 14— 2 |
| | 16 | 6— 0 | 6— 5 | 6— 9 | 7— 4 | 7— 8 | 8— 1 | 8— 7 | 9— 0 | 9— 5 | 10— 4 | 10— 8 |
| 2 x 10 | 12 | 10— 0 | 10— 8 | 11— 5 | 12— 1 | 12— 9 | 13— 7 | 14— 4 | 15— 0 | 15— 8 | 17— 1 | 17— 9 |
| | 16 | 7— 6 | 8— 1 | 8— 7 | 9— 2 | 9— 8 | 10— 2 | 10— 9 | 11— 4 | 11—10 | 12—10 | 13— 6 |
| 2 x 12 | 12 | 12— 0 | 12—10 | 13— 8 | 14— 7 | 15— 5 | 16— 4 | 17— 2 | 18— 0 | 18—10 | 20— 7 | 21— 6 |
| | 16 | 9— 1 | 9— 8 | 10— 5 | 11— 0 | 11— 8 | 12— 4 | 13— 0 | 13— 7 | 14— 4 | 15— 7 | 16— 2 |
| 2 x 14 | 12 | 14— 0 | 15— 0 | 16— 0 | 17— 0 | 18— 0 | 19— 0 | 20— 0 | 21— 0 | 22— 0 | 24— 0 | 25— 0 |
| | 16 | 10— 7 | 11— 5 | 12— 1 | 12—10 | 13— 7 | 14— 5 | 15— 1 | 15—10 | 16— 8 | 18— 2 | 18—10 |
| | 24 | 7— 1 | 7— 8 | 8— 2 | 8— 8 | 9— 2 | 9— 8 | 10— 2 | 10— 8 | 11— 2 | 12— 2 | 12— 9 |
| 3 x 6 | 12 | 9— 7 | 10— 2 | 10—10 | 11— 7 | 12— 4 | 13— 0 | 13— 8 | 14— 4 | 15— 0 | 16— 5 | 17— 1 |
| | 16 | 7— 2 | 7— 8 | 8— 4 | 8— 9 | 9— 4 | 9— 9 | 10— 4 | 10— 9 | 11— 5 | 12— 5 | 12—10 |
| 3 x 8 | 12 | 12— 7 | 13— 6 | 14— 5 | 15— 4 | 16— 2 | 17— 1 | 18— 0 | 18—10 | 19— 9 | 21— 7 | 22— 6 |
| | 16 | 9— 7 | 10— 2 | 10—10 | 11— 7 | 12— 4 | 13— 0 | 13— 7 | 14— 4 | 15— 0 | 16— 5 | 17— 1 |
| | 24 | 6— 5 | 6—10 | 7— 5 | 7— 9 | 8— 4 | 8— 8 | 9— 2 | 9— 7 | 10— 1 | 11— 0 | 11— 6 |
| 3 x 10 | 12 | 15— 9 | 16—10 | 18— 1 | 19— 2 | 20— 4 | 21— 6 | 22— 7 | 23— 8 | 24— 9 | 27— 1 | 28— 2 |
| | 16 | 12— 0 | 12—10 | 13— 8 | 14— 7 | 15— 5 | 16— 4 | 17— 2 | 18— 0 | 18—10 | 20— 7 | 21— 5 |
| | 24 | 8— 1 | 8— 8 | 9— 4 | 9— 9 | 10— 5 | 11— 0 | 11— 7 | 12— 2 | 12— 8 | 13—10 | 14— 6 |
| 3 x 12 | 12 | 18—10 | 20— 4 | 21— 7 | 23— 0 | 24— 5 | 25— 8 | 27— 1 | 28— 5 | 29— 9 | 30— 0 | |
| | 16 | 14— 5 | 15— 6 | 16— 6 | 17— 6 | 18— 6 | 19— 7 | 20— 7 | 21— 7 | 22— 8 | 24— 8 | 25— 9 |
| | 24 | 9— 9 | 10— 6 | 11— 2 | 11—10 | 12— 6 | 13— 2 | 13—10 | 14— 7 | 15— 4 | 16— 8 | 17— 5 |
| 3 x 14 | 12 | 22— 0 | 23— 7 | 25— 2 | 26— 8 | 28— 4 | 29—10 | 30— 0 | | | | |
| | 16 | 16— 9 | 18— 0 | 19— 2 | 20— 5 | 21— 7 | 22— 9 | 24— 0 | 25— 2 | 26— 5 | 28— 9 | 30— 0 |
| | 24 | 11— 5 | 12— 2 | 13— 0 | 13— 9 | 14— 8 | 15— 6 | 16— 4 | 17— 1 | 17—10 | 19— 6 | 20— 4 |
| 4 x 6 | 12 | 13— 1 | 14— 0 | 14—10 | 15—10 | 16— 9 | 17— 8 | 18— 8 | 19— 7 | 20— 6 | 22— 5 | 23— 4 |
| | 16 | 9—10 | 10— 7 | 11— 4 | 12— 0 | 12— 8 | 13— 5 | 14— 1 | 14— 9 | 15— 7 | 17— 0 | 17— 8 |
| | 24 | 6— 8 | 7— 1 | 7— 7 | 8— 1 | 8— 7 | 9— 0 | 9— 6 | 10— 0 | 10— 6 | 11— 5 | 11—10 |
| 4 x 8 | 12 | 17— 2 | 18— 5 | 19— 7 | 20—10 | 22— 1 | 23— 4 | 24— 6 | 25— 9 | 27— 0 | 29— 5 | 30— 0 |
| | 16 | 13— 1 | 14— 0 | 14—10 | 15—10 | 16— 9 | 17— 8 | 18— 7 | 19— 7 | 20— 6 | 22— 5 | 23— 4 |
| | 24 | 8— 9 | 9— 5 | 10— 1 | 10— 8 | 11— 4 | 12— 0 | 12— 7 | 13— 2 | 13—10 | 15— 1 | 15— 8 |
| 4 x 10 | 12 | 21— 5 | 23— 0 | 24— 6 | 26— 0 | 27— 7 | 29— 1 | 30— 0 | | | | |
| | 16 | 16— 4 | 17— 6 | 18— 8 | 19— 9 | 21— 0 | 22— 2 | 23— 4 | 24— 6 | 25— 8 | 28— 0 | 29— 2 |
| | 24 | 11— 1 | 11—10 | 12— 8 | 13— 6 | 14— 4 | 15— 0 | 15— 9 | 16— 7 | 17— 5 | 19— 0 | 19— 9 |

NOTE.—The lengths are based on:
Allowable horizontal shear stress as noted for "S."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—125 pounds per square foot of floor area with plastered ceiling, or
135 pounds per square foot with ceiling unplastered.

These spans MUST be Compared and Checked with those on page Seventeen





## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 150 Pounds per Square Foot with Plastered Ceiling. Live Load 160 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Spans Determined by Bending (Read Carefully)** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of timber used, refer to the column below with the corresponding value to determine the span limited by the **bending strength** of the joist. **THEN** refer to the table on page 17 and in the same manner determine the span of the joist limited by **horizontal shear and use the shorter of the two spans.** | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 7—10 | 8— 5 | 8— 9 | 9— 2 | 7— 4 | 7— 8 | 8— 1 | 8— 5 | 8— 9 | 9— 1 | 9— 5 | 9— 8 | 10— 1 | 10— 4 |
| | 16 | 7— 2 | 7— 7 | 8— 0 | 8— 5 | 6— 5 | 6— 8 | 7— 0 | 7— 4 | 7— 7 | 7—10 | 8— 2 | 8— 6 | 8— 8 | 9— 0 |
| 2 x 10 | 12 | 10— 0 | 10— 7 | 11— 2 | 11— 8 | 9— 4 | 9— 8 | 10— 2 | 10— 8 | 11— 1 | 11— 7 | 12— 0 | 12— 5 | 12— 9 | 13— 1 |
| | 16 | 9— 1 | 9— 8 | 10— 2 | 10— 8 | 8— 0 | 8— 6 | 8—10 | 9— 4 | 9— 7 | 10— 0 | 10— 5 | 10— 8 | 11— 0 | 11— 5 |
| 2 x 12 | 12 | 12— 1 | 12—10 | 13— 6 | 14— 2 | 11— 2 | 11— 9 | 12— 5 | 12—10 | 13— 5 | 13—10 | 14— 5 | 15— 0 | 15— 5 | 15—10 |
| | 16 | 11— 0 | 11— 8 | 12— 4 | 12—10 | 9— 8 | 10— 2 | 10— 9 | 11— 2 | 11— 8 | 12— 2 | 12— 7 | 13— 0 | 13— 5 | 13— 9 |
| 2 x 14 | 12 | 14— 3 | 15— 1 | 15—11 | 16— 7 | 13— 3 | 13—11 | 14— 6 | 15— 3 | 15—10 | 16— 5 | 16—11 | 17— 6 | 18— 1 | 18— 7 |
| | 16 | 13— 0 | 13—10 | 14— 6 | 15— 7 | 11— 5 | 12— 0 | 12— 7 | 13— 3 | 13— 9 | 14— 3 | 14—10 | 15— 3 | 15— 9 | 16— 3 |
| 3 x 6 | 12 | 7— 0 | 7— 5 | 7—10 | 8— 3 | 7— 0 | 7— 5 | 7— 9 | 8— 1 | 8— 5 | 8— 9 | 9— 1 | 9— 4 | 9— 7 | 9—11 |
| | 16 | 6— 4 | 6— 9 | 7— 1 | 7— 6 | 6— 1 | 6— 5 | 6— 9 | 7— 0 | 7— 4 | 7— 7 | 7—11 | 8— 1 | 8— 5 | 8— 7 |
| 3 x 8 | 12 | 9— 4 | 9—11 | 10— 5 | 10—11 | 9— 4 | 9—10 | 10— 4 | 10— 9 | 11— 4 | 11— 7 | 12— 0 | 12— 5 | 12—10 | 13— 3 |
| | 16 | 8— 5 | 9— 0 | 9— 6 | 9—11 | 8— 1 | 8— 6 | 8—11 | 9— 4 | 9—10 | 10— 1 | 10— 5 | 10—10 | 11— 1 | 11— 5 |
| 3 x 10 | 12 | 11— 9 | 12— 6 | 13— 1 | 13— 9 | 11— 9 | 12— 5 | 13— 0 | 13— 6 | 14— 1 | 14— 7 | 15— 1 | 15— 9 | 16— 1 | 16— 7 |
| | 16 | 10— 9 | 11— 5 | 12— 0 | 12— 6 | 10— 3 | 10—10 | 11— 4 | 11—10 | 12— 4 | 12— 9 | 13— 3 | 13— 7 | 14— 0 | 14— 6 |
| | 24 | 9— 5 | 10— 0 | 10— 6 | 11— 0 | 8— 5 | 8—10 | 9— 4 | 9— 9 | 10— 0 | 10— 5 | 10—10 | 11— 3 | 11— 6 | 11—10 |
| 3 x 12 | 12 | 14— 3 | 15— 0 | 15—10 | 16— 7 | 14— 1 | 14—11 | 15— 7 | 16— 4 | 17— 0 | 17— 7 | 18— 3 | 18—10 | 19— 5 | 20— 0 |
| | 16 | 12—11 | 13— 9 | 14— 6 | 15— 1 | 12— 4 | 13— 0 | 13— 7 | 14— 3 | 14—10 | 15— 5 | 15—11 | 16— 5 | 16—11 | 17— 5 |
| | 24 | 11— 4 | 12— 0 | 12— 9 | 13— 4 | 10— 1 | 10— 9 | 11— 3 | 11— 9 | 12— 3 | 12— 7 | 13— 1 | 13— 6 | 13—11 | 14— 4 |
| 3 x 14 | 12 | 16— 7 | 17— 7 | 18— 6 | 19— 5 | 16— 6 | 17— 5 | 18— 4 | 19— 1 | 19—10 | 20— 7 | 21— 4 | 22— 0 | 22— 9 | 23— 5 |
| | 16 | 15— 1 | 16— 1 | 16—11 | 17— 9 | 14— 5 | 15— 3 | 15—11 | 16— 7 | 17— 4 | 18— 0 | 18— 7 | 19— 3 | 19—10 | 20— 5 |
| | 24 | 13— 4 | 14— 1 | 14—11 | 15— 6 | 11—11 | 12— 6 | 13— 1 | 13— 9 | 14— 3 | 14—10 | 15— 4 | 15—10 | 16— 4 | 16—10 |
| 4 x 6 | 12 | 7—10 | 8— 3 | 8— 9 | 9— 1 | 8— 3 | 8— 9 | 9— 1 | 9— 6 | 9—10 | 10— 3 | 10— 7 | 10—11 | 11— 4 | 11— 7 |
| | 16 | 7— 1 | 7— 6 | 7—11 | 8— 4 | 7— 1 | 7— 6 | 7—11 | 8— 3 | 8— 6 | 8—11 | 9— 3 | 9— 6 | 9—10 | 10— 1 |
| | 24 | 6— 3 | 6— 7 | 6—11 | 7— 3 | 5—10 | 6— 3 | 6— 6 | 6—10 | 7— 0 | 7— 4 | 7— 6 | 7—10 | 8— 1 | 8— 3 |
| 4 x 8 | 12 | 10— 4 | 10—11 | 11— 6 | 12— 0 | 10—11 | 11— 5 | 12— 0 | 12— 7 | 13— 1 | 13— 7 | 14— 0 | 14— 6 | 14—11 | 15— 5 |
| | 16 | 9— 5 | 10— 0 | 10— 6 | 11— 0 | 9— 6 | 10— 0 | 10— 6 | 10—11 | 11— 5 | 11—10 | 12— 3 | 12— 7 | 13— 0 | 13— 5 |
| | 24 | 8— 3 | 8—10 | 9— 3 | 9— 7 | 7— 9 | 8— 3 | 8— 7 | 9— 0 | 9— 4 | 9— 9 | 10— 0 | 10— 4 | 10— 9 | 11— 0 |
| 4 x 10 | 12 | 13— 0 | 13—10 | 14— 6 | 15— 3 | 13— 9 | 14— 5 | 15— 1 | 15—10 | 16— 6 | 17— 1 | 17— 9 | 18— 3 | 18—10 | 19— 5 |
| | 16 | 11—11 | 12— 7 | 13— 4 | 13—11 | 11—11 | 12— 7 | 13— 3 | 13—10 | 14— 5 | 14—11 | 15— 5 | 15—11 | 16— 5 | 16—11 |
| | 24 | 10— 5 | 11— 1 | 11— 9 | 12— 3 | 9—10 | 10— 4 | 10—11 | 11— 4 | 11—10 | 12— 3 | 12— 9 | 13— 1 | 13— 6 | 13—11 |

**NOTE.**—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—150 pounds per square foot of floor area with plastered ceiling, or
160 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR FLOOR JOISTS—UNIFORMLY LOADED

Live Load 150 Pounds per Square Foot with Plastered Ceiling. Live Load 160 Pounds per Square Foot with Unplastered Ceiling.

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Spans Limited by Horizontal Shear (Read Carefully)** Having determined by reference to the building code or the table on page 1 the **horizontal shear stress** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine the span limited by the **horizontal shear stress. THEN** refer to the tables on page 16 and in the same manner determine the span of the joist limited by its **bending strength** and use the shorter of the two spans. | | | | | | | | | | |
| | | S=70 | S=75 | S=80 | S=85 | S=90 | S=95 | S=100 | S=105 | S=110 | S=120 | S=125 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 8 | 12 | 6— 9 | 7— 2 | 7— 8 | 8— 2 | 8— 8 | 9— 2 | 9— 8 | 10— 1 | 10— 7 | 11— 7 | 12— 1 |
| | 16 | 5— 1 | 5— 6 | 5— 9 | 6— 2 | 6— 6 | 6—10 | 7— 4 | 7— 7 | 8— 0 | 8— 8 | 9— 1 |
| 2 x 10 | 12 | 8— 6 | 9— 1 | 9— 8 | 10— 4 | 10—10 | 11— 7 | 12— 2 | 12— 9 | 13— 5 | 14— 7 | 15— 2 |
| | 16 | 6— 5 | 6—10 | 7— 4 | 7— 9 | 8— 4 | 8— 8 | 9— 2 | 9— 7 | 10— 1 | 11— 0 | 11— 6 |
| 2 x 12 | 12 | 10— 2 | 11— 0 | 11— 8 | 12— 5 | 13— 2 | 13—10 | 14— 7 | 15— 5 | 16— 1 | 17— 7 | 18— 4 |
| | 16 | 7— 8 | 8— 4 | 8—10 | 9— 5 | 10— 0 | 10— 6 | 11— 1 | 11— 7 | 12— 2 | 13— 4 | 13— 9 |
| 2 x 14 | 12 | 11—10 | 12— 9 | 13— 7 | 14— 6 | 15— 4 | 16— 2 | 17— 0 | 17—10 | 18— 9 | 20— 6 | 21— 4 |
| | 16 | 9— 0 | 9— 8 | 10— 4 | 11— 0 | 11— 7 | 12— 4 | 12—10 | 13— 7 | 14— 2 | 15— 6 | 16— 1 |
| 3 x 6 | 12 | 8— 1 | 8— 8 | 9— 4 | 9—10 | 10— 6 | 11— 1 | 11— 7 | 12— 2 | 12— 9 | 14— 0 | 14— 7 |
| | 16 | 6— 2 | 6— 7 | 7— 0 | 7— 6 | 7—10 | 8— 4 | 8— 9 | 9— 2 | 9— 8 | 10— 6 | 11— 0 |
| 3 x 8 | 12 | 10— 9 | 11— 6 | 12— 4 | 13— 1 | 13— 9 | 14— 7 | 15— 5 | 16— 2 | 16—10 | 18— 6 | 19— 2 |
| | 16 | 8— 1 | 8— 8 | 9— 4 | 9—10 | 10— 6 | 11— 0 | 11— 7 | 12— 2 | 12— 9 | 14— 0 | 14— 6 |
| 3 x 10 | 12 | 13— 6 | 14— 6 | 15— 5 | 16— 5 | 17— 5 | 18— 4 | 19— 4 | 20— 4 | 21— 2 | 23— 2 | 24— 1 |
| | 16 | 10— 2 | 11— 0 | 11— 8 | 12— 5 | 13— 2 | 13—10 | 14— 7 | 15— 5 | 16— 1 | 17— 7 | 18— 4 |
| | 24 | 6—10 | 7— 5 | 7—10 | 8— 5 | 8—10 | 9— 5 | 9—10 | 10— 5 | 10— 9 | 11— 9 | 12— 4 |
| 3 x 12 | 12 | 16— 2 | 17— 5 | 18— 6 | 19— 8 | 20—10 | 22— 0 | 23— 2 | 24— 4 | 25— 6 | 27— 9 | 29— 0 |
| | 16 | 12— 4 | 13— 2 | 14— 1 | 15— 0 | 15— 9 | 16— 8 | 17— 7 | 18— 6 | 19— 5 | 21— 1 | 22— 0 |
| | 24 | 8— 4 | 8—10 | 9— 6 | 10— 1 | 10— 8 | 11— 4 | 11—10 | 12— 6 | 13— 1 | 14— 4 | 14—10 |
| 3 x 14 | 12 | 18—10 | 20— 2 | 21— 7 | 22—10 | 24— 4 | 25— 7 | 27— 0 | 28— 4 | 29— 8 | 30— 0 | |
| | 16 | 14— 5 | 15— 5 | 16— 5 | 17— 5 | 18— 6 | 19— 6 | 20— 6 | 21— 6 | 22— 7 | 24— 7 | 25— 8 |
| | 24 | 9— 8 | 10— 5 | 11— 1 | 11— 9 | 12— 6 | 13— 2 | 13—10 | 14— 7 | 15— 4 | 16— 8 | 17— 5 |
| 4 x 6 | 12 | 11— 2 | 11—10 | 12— 8 | 13— 6 | 14— 4 | 15— 1 | 15—10 | 16— 8 | 17— 6 | 19— 1 | 19—10 |
| | 16 | 8— 5 | 9— 0 | 9— 7 | 10— 2 | 10— 9 | 11— 5 | 12— 1 | 12— 8 | 13— 4 | 14— 6 | 15— 1 |
| | 24 | 5— 8 | 6— 1 | 6— 6 | 6—10 | 7— 4 | 7— 8 | 8— 1 | 8— 6 | 8—10 | 9— 8 | 10— 1 |
| 4 x 8 | 12 | 14— 8 | 15— 8 | 16— 9 | 17— 9 | 18—10 | 19—10 | 21— 0 | 22— 0 | 23— 1 | 25— 2 | 26— 2 |
| | 16 | 11— 1 | 11—10 | 12— 8 | 13— 6 | 14— 4 | 15— 1 | 15—10 | 16— 8 | 17— 6 | 19— 1 | 19—10 |
| | 24 | 7— 6 | 8— 0 | 8— 7 | 9— 1 | 9— 8 | 10— 2 | 10— 8 | 11— 4 | 11— 9 | 12—10 | 13— 5 |
| 4 x 10 | 12 | 18— 5 | 19— 8 | 21— 0 | 22— 4 | 23— 7 | 24—10 | 26— 4 | 27— 7 | 28—10 | 30— 0 | |
| | 16 | 14— 0 | 15— 0 | 16— 0 | 17— 0 | 18— 0 | 19— 0 | 20— 0 | 21— 0 | 22— 0 | 24— 0 | 25— 0 |
| | 24 | 9— 6 | 10— 1 | 10— 9 | 11— 6 | 12— 2 | 12— 9 | 13— 6 | 14— 2 | 14—10 | 16— 2 | 16—10 |

NOTE.—The lengths are based on:
Allowable horizontal shear stress as noted for "S."

Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Double thickness of flooring (5 pounds per square foot).
Live load—150 pounds per square foot of floor area with plastered ceiling, or
160 pounds per square foot with ceiling unplastered.

## MAXIMUM SPANS FOR CEILING JOISTS AND ATTIC FLOOR JOISTS—UNIFORMLY LOADED

| Size of Joists (Nominal) in Inches | Spacing of Joists Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS (Clear Span) Limited by Deflection of 1/360 of the Span. Having determined by reference to the building code or the table on page 1 the allowable modulus of elasticity in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | CEILING JOISTS | | | | ATTIC FLOOR JOISTS—Live Load 20 lbs. per sq. ft. | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 9— 4 | 10— 0 | 10— 6 | 11— 0 | 6— 6 | 7— 0 | 7— 4 | 7— 8 |
| | 16 | 8— 7 | 9— 2 | 9— 8 | 10— 0 | 5—11 | 6— 3 | 6— 8 | 6—11 |
| | 24 | 7— 7 | 8— 1 | 8— 6 | 8—11 | 5— 3 | 5— 7 | 5—10 | 6— 1 |
| 2 x 6 | 12 | 14— 2 | 15— 5 | 15—10 | 16— 7 | 10— 0 | 10— 9 | 11— 3 | 11— 0 |
| | 16 | 13— 3 | 14— 0 | 14— 8 | 15— 4 | 9— 1 | 9— 8 | 10— 2 | 10— 8 |
| | 24 | 11— 8 | 12— 5 | 13— 0 | 13— 8 | 8— 1 | 8— 7 | 9— 0 | 9— 7 |
| 2 x 8 | 12 | 18— 6 | 19— 8 | 20— 0 | 21— 8 | 13— 4 | 14— 2 | 14—11 | 15— 7 |
| | 16 | 17— 2 | 18— 3 | 19— 3 | 20— 2 | 12— 1 | 12—10 | 13— 6 | 14— 2 |
| | 24 | 15— 4 | 16— 4 | 17— 2 | 18— 0 | 10— 9 | 11— 5 | 12— 0 | 12— 7 |
| 2 x 10 | 12 | 23— 0 | 24— 5 | 25— 8 | 26—10 | 16— 9 | 17— 9 | 18— 9 | 19— 7 |
| | 16 | 21— 4 | 22— 9 | 24— 0 | 25— 0 | 15— 3 | 16— 2 | 17— 0 | 17— 9 |
| | 24 | 19— 3 | 20— 5 | 21— 6 | 22— 6 | 13— 7 | 14— 5 | 15— 2 | 15—10 |
| 2 x 12 | 12 | 27— 2 | 28—11 | 30— 0 | | 20— 0 | 21— 4 | 22— 6 | 23— 6 |
| | 16 | 25— 6 | 27— 0 | 28— 6 | 29— 9 | 18— 4 | 19— 5 | 20— 6 | 21— 5 |
| | 24 | 23— 0 | 24— 5 | 25— 9 | 26—10 | 16— 4 | 17— 4 | 18— 3 | 19— 1 |

**NOTE.**—The lengths are based on:
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
Ceiling joists
Dead load—Weight of joists plus plaster ceiling (10 pounds per square foot).
Live load—None.

Attic floor joists
Dead load—Weight of joist.
Weight of lath and plaster ceiling (10 pounds per square foot).
Single thickness of flooring (2.5 pounds per square foot).
Live load—20 pounds per square foot of floor area.

## MAXIMUM SPANS FOR RAFTERS—UNIFORMLY LOADED

Slope of 20° or more. Live Load 15 Pounds per Square Foot.

| Size of Rafters (Nominal) in inches | Spacing of Rafters Center to Center in Inches | MAXIMUM ALLOWABLE UNSUPPORTED LENGTHS FROM PLATE TO RIDGE (Without Collar Beams) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 7— 7 | 8— 0 | 8— 6 | 8—11 | 9—11 | 10— 4 | 10—11 | 11— 5 | 11—11 | 12— 4 | 12— 9 | 13— 2 | 13— 7 | 14— 0 |
| | 16 | 6—11 | 7— 5 | 7— 8 | 8— 1 | 8— 8 | 9— 1 | 9— 6 | 10— 0 | 10— 5 | 10— 9 | 11— 2 | 11— 7 | 11—10 | 12— 4 |
| | 24 | 6— 1 | 6— 6 | 6— 9 | 7— 1 | 7— 1 | 7— 6 | 7—11 | 8— 2 | 8— 7 | 8—10 | 9— 2 | 9— 6 | 9— 9 | 10— 1 |
| 2 x 6 | 12 | 11— 7 | 12— 5 | 13— 0 | 13— 7 | 15— 1 | 15—10 | 16— 8 | 17— 5 | 18— 1 | 18— 9 | 19— 6 | 20— 1 | 20— 8 | 21— 4 |
| | 16 | 10— 8 | 11— 4 | 12— 0 | 12— 6 | 13— 2 | 14— 0 | 14— 8 | 15— 4 | 15—10 | 16— 6 | 17— 1 | 17— 8 | 18— 2 | 18— 9 |
| | 24 | 9— 5 | 10— 0 | 10— 6 | 11— 0 | 11— 0 | 11— 7 | 12— 2 | 12— 8 | 13— 2 | 13— 8 | 14— 2 | 14— 7 | 15— 1 | 15— 6 |
| 2 x 8 | 12 | 15— 4 | 16— 4 | 17— 1 | 17—10 | 19— 8 | 20— 9 | 21— 9 | 22— 9 | 23— 8 | 24— 7 | 25— 6 | 26— 4 | 27— 1 | 27—10 |
| | 16 | 14— 1 | 15— 0 | 15— 9 | 16— 6 | 17— 5 | 18— 5 | 19— 4 | 20— 1 | 20—10 | 21— 8 | 22— 6 | 23— 4 | 24— 0 | 24— 7 |
| | 24 | 12— 6 | 13— 2 | 13—10 | 14— 7 | 14— 6 | 15— 4 | 16— 0 | 16— 8 | 17— 5 | 18— 0 | 18— 8 | 19— 4 | 19—10 | 20— 6 |
| 2 x 10 | 12 | 19— 2 | 20— 5 | 21— 6 | 22— 5 | 24— 6 | 25—10 | 27— 1 | 28— 4 | 29— 6 | 30— 0 | | | | |
| | 16 | 17— 8 | 18— 9 | 19— 9 | 20— 8 | 21— 9 | 22—10 | 24— 0 | 25— 1 | 26— 1 | 27— 1 | 28— 1 | 29— 0 | 29—10 | 30— 0 |
| | 24 | 15— 8 | 16— 8 | 17— 6 | 18— 4 | 18— 2 | 19— 1 | 20— 1 | 21— 0 | 21— 9 | 22— 7 | 23— 5 | 24— 2 | 25— 0 | 25— 8 |
| 2 x 12 | 12 | 22—10 | 24— 5 | 25— 7 | 26— 9 | 29— 2 | 30— 0 | | | | | | | | |
| | 16 | 21— 2 | 22— 6 | 23— 8 | 24— 9 | 26— 0 | 27— 5 | 28— 8 | 30— 0 | | | | | | |
| | 24 | 18—10 | 20— 0 | 21— 1 | 22— 1 | 21— 9 | 23— 0 | 24— 1 | 25— 1 | 26— 2 | 27— 2 | 28— 1 | 29— 0 | 29—10 | 30— 0 |
| 2 x 14 | 12 | 26— 6 | 28— 1 | 29— 9 | 30— 0 | | | | | | | | | | |
| | 16 | 24— 7 | 26— 3 | 27— 6 | 28—10 | 29—11 | 30— 0 | | | | | | | | |
| | 24 | 22— 0 | 23— 5 | 24— 7 | 25— 9 | 25— 3 | 26— 7 | 27—11 | 29— 1 | 30— 0 | | | | | |
| 3 x 6 | 12 | 13— 5 | 14— 3 | 14—11 | 15— 7 | 18— 6 | 19— 6 | 20— 6 | 21— 5 | 22— 4 | 23— 1 | 23—11 | 24— 9 | 25— 6 | 26— 3 |
| | 16 | 12— 4 | 13— 1 | 13—10 | 14— 5 | 16— 5 | 17— 4 | 18— 3 | 18—11 | 19— 9 | 20— 6 | 21— 3 | 21—11 | 22— 7 | 23— 3 |
| | 24 | 10—11 | 11— 7 | 12— 3 | 12—10 | 13— 9 | 14— 6 | 15— 3 | 15—10 | 16— 6 | 17— 1 | 17— 9 | 18— 4 | 18—10 | 19— 5 |
| 3 x 8 | 12 | 17— 6 | 18— 7 | 19— 6 | 20— 5 | 24— 0 | 25— 4 | 26— 6 | 27— 9 | 29— 0 | 30— 0 | | | | |
| | 16 | 16— 3 | 17— 3 | 18— 1 | 18—11 | 21— 5 | 22— 6 | 23— 7 | 24— 9 | 25—11 | 26— 9 | 27— 7 | 28— 6 | 29— 5 | 30— 0 |
| | 24 | 14— 5 | 15— 4 | 16— 1 | 16—10 | 18— 0 | 18—11 | 19—11 | 20—10 | 21— 9 | 22— 5 | 23— 3 | 24— 0 | 24— 9 | 25— 5 |
| 3 x 10 | 12 | 21— 9 | 23— 1 | 24— 4 | 25— 5 | 29— 6 | 30— 0 | | | | | | | | |
| | 16 | 20— 3 | 21— 5 | 22— 7 | 23— 7 | 26— 6 | 27—11 | 29— 4 | 30— 0 | | | | | | |
| | 24 | 18— 0 | 19— 3 | 20— 3 | 21— 1 | 22— 5 | 23— 7 | 24—10 | 25—11 | 26—11 | 27—11 | 28—11 | 30— 0 | | |

**NOTE**—The lengths are based on:

When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."

When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof coverings (2.5 pounds per square foot). (Group I.)

Live load—15 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR RAFTERS—UNIFORMLY LOADED

Slope of 20° or more. Live Load 20 Pounds per Square Foot.

| Size of Rafters (Nominal) in Inches | Spacing of Rafters Center to Center in Inches | MAXIMUM ALLOWABLE UNSUPPORTED LENGTHS FROM PLATE TO RIDGE (Without Collar Beams) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Limited by Deflection of 1/360 of the Span. Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | Determined by Bending. Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 7— 1 | 7— 6 | 7—10 | 8— 4 | 8—10 | 9— 5 | 9— 9 | 10— 4 | 10— 8 | 11— 1 | 11— 6 | 11—10 | 12— 3 | 12— 7 |
| | 16 | 6— 6 | 6— 9 | 7— 2 | 7— 6 | 7— 9 | 8— 4 | 8— 7 | 9— 0 | 9— 4 | 9— 7 | 10— 1 | 10— 5 | 10— 8 | 11— 0 |
| | 24 | 5— 7 | 6— 0 | 6— 4 | 6— 7 | 6— 5 | 6— 8 | 7— 0 | 7— 5 | 7— 8 | 8— 0 | 8— 4 | 8— 6 | 8— 9 | 9— 1 |
| 2 x 6 | 12 | 10— 9 | 11— 6 | 13— 5 | 12— 8 | 13— 7 | 14— 5 | 15— 0 | 15— 8 | 16— 5 | 17— 0 | 17— 7 | 18— 1 | 18— 8 | 19— 2 |
| | 16 | 9—10 | 10— 7 | 11— 1 | 11— 7 | 11—10 | 12— 7 | 13— 2 | 13— 9 | 14— 5 | 14— 9 | 15— 5 | 15—10 | 16— 5 | 16—10 |
| | 24 | 8— 8 | 9— 8 | 9—10 | 10— 4 | 9— 9 | 10— 2 | 10—10 | 11— 5 | 11—10 | 12— 3 | 12— 8 | 13— 1 | 13— 7 | 14— 0 |
| 2 x 8 | 12 | 14— 4 | 15— 2 | 16— 1 | 16— 9 | 17—10 | 18—10 | 19— 9 | 20— 8 | 21— 6 | 22— 3 | 23— 1 | 23—10 | 24— 7 | 25— 4 |
| | 16 | 13— 2 | 14— 0 | 14— 8 | 15— 5 | 15— 8 | 16— 7 | 17— 5 | 18— 2 | 18—10 | 19— 6 | 20— 4 | 21— 0 | 21— 8 | 22— 4 |
| | 24 | 11— 7 | 12— 4 | 13— 0 | 13— 7 | 13— 0 | 13— 8 | 14— 5 | 15— 1 | 15— 8 | 16— 3 | 16— 9 | 17— 5 | 17—10 | 18— 5 |
| 2 x 10 | 12 | 18— 0 | 19— 1 | 20— 1 | 21— 0 | 22— 4 | 23— 6 | 24— 8 | 25— 9 | 26— 9 | 27— 8 | 28— 9 | 29— 8 | 30— 0 | |
| | 16 | 16— 7 | 17— 7 | 18— 6 | 19— 5 | 19— 8 | 20— 9 | 21— 9 | 22— 9 | 23— 8 | 24— 6 | 25— 6 | 26— 4 | 27— 1 | 27—10 |
| | 24 | 14— 7 | 15— 7 | 16— 5 | 17— 1 | 16— 5 | 17— 4 | 18— 1 | 18—10 | 19— 8 | 20— 5 | 21— 2 | 21—10 | 22— 6 | 23— 2 |
| 2 x 12 | 12 | 21— 7 | 22—10 | 24— 1 | 25— 2 | 26— 7 | 28— 1 | 29— 6 | 30— 0 | | | | | | |
| | 16 | 19—10 | 21— 1 | 22— 4 | 23— 4 | 23— 7 | 24—10 | 26— 1 | 27— 2 | 28— 5 | 29— 5 | 30— 0 | | | |
| | 24 | 17— 7 | 18— 8 | 19— 8 | 20— 7 | 19— 8 | 20— 9 | 21— 9 | 22— 8 | 23— 8 | 24— 6 | 25— 5 | 26— 4 | 27— 1 | 27—10 |
| 2 x 14 | 12 | 25— 0 | 26— 7 | 28— 0 | 29— 4 | 30— 0 | | | | | | | | | |
| | 16 | 23— 3 | 24— 7 | 25—11 | 27— 1 | 27— 4 | 28—10 | 30— 0 | | | | | | | |
| | 24 | 20— 7 | 21—11 | 23— 1 | 24— 1 | 23— 1 | 24— 1 | 25— 4 | 26— 5 | 27— 6 | 28— 6 | 29— 7 | 30— 0 | | |
| 3 x 6 | 12 | 12— 6 | 13— 4 | 14— 0 | 14— 9 | 16—11 | 17—10 | 18— 9 | 19— 6 | 20— 4 | 21— 0 | 21—10 | 22— 6 | 23— 3 | 23—11 |
| | 16 | 11— 6 | 12— 4 | 12—11 | 13— 6 | 14—11 | 15— 9 | 16— 6 | 17— 3 | 17—10 | 18— 6 | 19— 3 | 19—10 | 20— 5 | 21— 0 |
| | 24 | 10— 3 | 10—10 | 11— 5 | 11—11 | 12— 5 | 13— 0 | 13— 9 | 14— 4 | 14—11 | 15— 5 | 16— 0 | 16— 6 | 17— 0 | 17— 6 |
| 3 x 8 | 12 | 16— 5 | 17— 6 | 18— 5 | 19— 3 | 21—11 | 23— 1 | 24— 3 | 25— 4 | 26— 6 | 27— 4 | 28— 4 | 29— 3 | 30— 0 | |
| | 16 | 15— 3 | 16— 3 | 17— 0 | 17—10 | 19— 5 | 20— 6 | 21— 6 | 22— 6 | 23— 6 | 24— 4 | 25— 1 | 25—11 | 26— 9 | 27— 6 |
| | 24 | 13— 6 | 14— 4 | 15— 1 | 15—10 | 16— 4 | 17— 1 | 18— 0 | 18—10 | 19— 9 | 20— 4 | 21— 0 | 21— 9 | 22— 5 | 23— 0 |
| 3 x 10 | 12 | 20— 6 | 21—10 | 22—11 | 24— 0 | 27— 1 | 28— 7 | 30— 0 | | | | | | | |
| | 16 | 19— 0 | 20— 3 | 21— 4 | 22— 3 | 24— 3 | 25— 6 | 26— 9 | 27—11 | 29— 1 | 30— 0 | | | | |
| | 24 | 16—11 | 18— 0 | 18—11 | 19—10 | 20— 4 | 21— 5 | 22— 6 | 23— 6 | 24— 6 | 25— 5 | 26— 4 | 27— 1 | 28— 0 | 28—10 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof coverings (2.5 pounds per square foot). (Group I.)
Live load—20 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR RAFTERS—UNIFORMLY LOADED

Slope of 20° or more. Live Load 30 Pounds per Square Foot

| Size of Rafters (Nominal) in Inches | Spacing of Rafters Center to Center in Inches | MAXIMUM ALLOWABLE UNSUPPORTED LENGTHS FROM PLATE TO RIDGE (Without Collar Beans) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 6— 5 | 6— 9 | 7— 2 | 7— 6 | 7— 8 | 8— 0 | 8— 5 | 8— 9 | 9— 2 | 9— 7 | 9—11 | 10— 2 | 10— 5 | 10— 9 |
| | 16 | 5—10 | 6— 2 | 6— 6 | 6—10 | 6— 8 | 7— 0 | 7— 4 | 7— 8 | 7—11 | 8— 3 | 8— 6 | 8—10 | 9— 1 | 9— 5 |
| | 24 | 5— 1 | 5— 5 | 5— 8 | 6— 0 | 5— 5 | 5— 9 | 6— 0 | 6— 3 | 6— 7 | 6—10 | 7— 0 | 7— 3 | 7— 6 | 7— 8 |
| 2 x 6 | 12 | 9—10 | 10— 5 | 11— 0 | 11— 6 | 11— 8 | 12— 4 | 12—11 | 13— 6 | 14— 0 | 14— 6 | 15— 1 | 15— 7 | 16— 1 | 16— 6 |
| | 16 | 9— 0 | 9— 7 | 10— 1 | 10— 6 | 10— 2 | 10— 9 | 11— 3 | 11— 9 | 12— 3 | 12— 9 | 13— 2 | 13— 8 | 14— 0 | 14— 6 |
| | 24 | 7—11 | 8— 5 | 8—10 | 9— 3 | 8— 4 | 8—10 | 9— 3 | 9— 8 | 10— 1 | 10— 6 | 10—10 | 11— 2 | 11— 6 | 11—11 |
| 2 x 8 | 12 | 13— 1 | 13—10 | 14— 7 | 15— 3 | 15— 5 | 16— 3 | 17— 0 | 17—10 | 18— 6 | 19— 2 | 19—11 | 20— 7 | 21— 2 | 21—10 |
| | 16 | 11—11 | 12— 9 | 13— 4 | 14— 0 | 13— 6 | 14— 3 | 15— 0 | 15— 7 | 16— 3 | 16—10 | 17— 5 | 18— 0 | 18— 7 | 19— 1 |
| | 24 | 10— 6 | 11— 2 | 11— 9 | 12— 3 | 11— 2 | 11— 9 | 12— 4 | 12—10 | 13— 4 | 13—10 | 14— 5 | 14—10 | 15— 4 | 15— 9 |
| 2 x 10 | 12 | 16— 4 | 17— 5 | 18— 4 | 19— 2 | 19— 4 | 20— 4 | 21— 4 | 22— 3 | 23— 3 | 24— 1 | 24—11 | 25— 9 | 26— 6 | 27— 4 |
| | 16 | 15— 0 | 15—11 | 16—10 | 17— 6 | 17— 0 | 17—11 | 18— 9 | 19— 7 | 20— 5 | 21— 2 | 21—11 | 22— 8 | 23— 4 | 24— 0 |
| | 24 | 13— 4 | 14— 0 | 14—10 | 15— 6 | 14— 0 | 14—10 | 15— 6 | 16— 3 | 16—11 | 17— 6 | 18— 1 | 18— 8 | 19— 3 | 19—10 |
| 2 x 12 | 12 | 19— 8 | 20—11 | 22— 0 | 23— 0 | 23— 1 | 24— 5 | 25— 7 | 26— 8 | 27— 9 | 28—10 | 29—10 | 30— 0 | | |
| | 16 | 18— 1 | 19— 3 | 20— 3 | 21— 2 | 20— 4 | 21— 6 | 22— 6 | 23— 6 | 24— 6 | 25— 4 | 26— 3 | 27— 2 | 28— 0 | 28—10 |
| | 24 | 15—11 | 17— 0 | 17—10 | 18— 8 | 16—11 | 17—10 | 18— 8 | 19— 6 | 20— 3 | 21— 1 | 21—10 | 22— 6 | 23— 3 | 23—11 |
| 2 x 14 | 12 | 22—10 | 24— 4 | 25— 6 | 26— 9 | 26— 9 | 28— 3 | 29— 6 | 30— 0 | | | | | | |
| | 16 | 21— 3 | 22— 6 | 23— 9 | 24—10 | 23—10 | 25— 1 | 26— 5 | 27— 6 | 28— 9 | 29— 9 | 30— 0 | | | |
| | 24 | 18— 7 | 19—10 | 20—10 | 21—10 | 19— 9 | 20— 9 | 21— 9 | 22— 9 | 23— 7 | 24— 6 | 25— 5 | 26— 3 | 27— 0 | 27—10 |
| 3 x 6 | 12 | 11— 5 | 12— 1 | 12— 9 | 13— 4 | 14— 7 | 15— 4 | 16— 1 | 16—10 | 17— 6 | 18— 3 | 18—10 | 19— 5 | 20— 0 | 20— 7 |
| | 16 | 10— 5 | 11— 1 | 11— 9 | 12— 3 | 12—10 | 13— 6 | 14— 1 | 14—10 | 15— 5 | 15—11 | 16— 6 | 17— 1 | 17— 7 | 18— 1 |
| | 24 | 9— 3 | 9—10 | 10— 4 | 10—10 | 10— 7 | 11— 1 | 11— 9 | 12— 3 | 12— 9 | 13— 3 | 13— 9 | 14— 1 | 14— 6 | 15— 0 |
| 3 x 8 | 12 | 15— 0 | 15—11 | 16—10 | 17— 6 | 19— 1 | 20— 1 | 21— 0 | 22— 0 | 23— 0 | 23— 9 | 24— 7 | 25— 5 | 26— 3 | 26—11 |
| | 16 | 13—10 | 14— 7 | 15— 5 | 16— 1 | 16—10 | 17— 9 | 18— 7 | 19— 5 | 20— 4 | 21— 0 | 21— 9 | 22— 5 | 23— 1 | 23— 9 |
| | 24 | 12— 3 | 12—11 | 13— 7 | 14— 3 | 14— 0 | 14— 9 | 15— 5 | 16— 1 | 16—11 | 17— 5 | 18— 0 | 18— 7 | 19— 3 | 19— 9 |
| 3 x 10 | 12 | 18— 9 | 20— 0 | 21— 0 | 21—11 | 23— 9 | 25— 0 | 26— 3 | 27— 4 | 28— 6 | 29— 6 | 30— 0 | | | |
| | 16 | 17— 4 | 18— 4 | 19— 4 | 20— 3 | 21— 0 | 22— 1 | 23— 3 | 24— 3 | 25— 3 | 26— 3 | 27— 1 | 28— 0 | 28—10 | 29— 9 |
| | 24 | 15— 4 | 16— 4 | 17— 1 | 17—11 | 17— 6 | 18— 6 | 19— 5 | 20— 3 | 21— 0 | 21—10 | 22— 7 | 23— 4 | 24— 1 | 24—10 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof coverings (2.5 pounds per square foot). (Group I.)
Live load—30 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR RAFTERS—UNIFORMLY LOADED

Slope of 20° or more. Live Load 40 Pounds per Square Foot.

MAXIMUM ALLOWABLE UNSUPPORTED LENGTHS FROM PLATE TO RIDGE (Without Collar Beams)

| Size of Rafters (Nominal) in Inches | Spacing of Rafters Center to Center in Inches | Limited by Deflection of 1/360 of the Span. Having determined by reference to the building code or the table on page 1 the allowable modulus of elasticity in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | Determined by Bending. Having determined by reference to the building code or the table on page 1 the allowable extreme fibre stress in bending in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 5— 9 | 6— 2 | 6— 6 | 6— 9 | 6— 8 | 7— 1 | 7— 5 | 7— 9 | 8— 1 | 8— 5 | 8— 8 | 9— 0 | 9— 2 | 9— 6 |
| | 16 | 5— 4 | 5— 8 | 6— 0 | 6— 2 | 5—10 | 6— 1 | 6— 5 | 6— 8 | 7— 0 | 7— 4 | 7— 7 | 7— 9 | 8— 0 | 8— 4 |
| | 24 | 4— 8 | 5— 0 | 5— 2 | 5— 5 | 4— 9 | 5— 0 | 5— 2 | 5— 6 | 5— 9 | 6— 0 | 6— 2 | 6— 5 | 6— 7 | 6— 9 |
| 2 x 6 | 12 | 9— 0 | 9— 7 | 10— 1 | 10— 7 | 10— 2 | 10—10 | 11— 5 | 12— 0 | 12— 5 | 12—10 | 13— 5 | 13— 9 | 14— 2 | 14— 7 |
| | 16 | 8— 2 | 8— 9 | 8—10 | 9— 8 | 9— 0 | 9— 6 | 10— 0 | 10— 5 | 10—10 | 11— 4 | 11— 8 | 12— 0 | 12— 5 | 12— 9 |
| | 24 | 7— 2 | 7— 8 | 8— 1 | 8— 6 | 7— 5 | 7— 9 | 8— 2 | 8— 7 | 8—10 | 9— 3 | 9— 7 | 9—10 | 10— 2 | 10— 6 |
| 2 x 8 | 12 | 12— 0 | 12— 9 | 13— 5 | 14— 0 | 13— 8 | 14— 5 | 15— 1 | 15— 9 | 16— 6 | 17— 1 | 17— 8 | 18— 4 | 18— 9 | 19— 5 |
| | 16 | 11— 0 | 11— 8 | 12— 4 | 12— 9 | 12— 0 | 12— 7 | 13— 2 | 13— 9 | 14— 5 | 14—10 | 15— 5 | 16— 0 | 16— 5 | 16—10 |
| | 24 | 9— 7 | 10— 2 | 10— 9 | 11— 4 | 9—10 | 10— 5 | 10—10 | 11— 5 | 11— 9 | 12— 4 | 12— 8 | 13— 1 | 13— 7 | 14— 0 |
| 2 x 10 | 12 | 15— 1 | 16— 1 | 16—10 | 17— 8 | 17— 2 | 18— 1 | 19— 0 | 19—10 | 20— 8 | 21— 6 | 22— 2 | 23— 0 | 23— 8 | 24— 4 |
| | 16 | 13— 9 | 14— 8 | 15— 6 | 16— 2 | 15— 1 | 15—10 | 16— 8 | 17— 5 | 18— 1 | 18— 9 | 19— 5 | 20— 1 | 20— 8 | 21— 4 |
| | 24 | 12— 2 | 12—10 | 13— 7 | 14— 2 | 12— 5 | 13— 1 | 13— 8 | 14— 4 | 15— 0 | 15— 6 | 16— 0 | 16— 7 | 17— 1 | 17— 7 |
| 2 x 12 | 12 | 18— 2 | 19— 4 | 20— 5 | 21— 4 | 20— 7 | 21— 9 | 22— 9 | 23— 9 | 24— 9 | 25— 8 | 26— 8 | 27— 6 | 28— 5 | 29— 2 |
| | 16 | 16— 8 | 17— 8 | 18— 8 | 19— 6 | 18— 1 | 19— 1 | 20— 0 | 20—10 | 21— 9 | 22— 7 | 23— 5 | 24— 2 | 24—10 | 25— 7 |
| | 24 | 14— 8 | 15— 7 | 16— 5 | 17— 2 | 15— 0 | 15— 9 | 16— 7 | 17— 4 | 18— 0 | 18— 8 | 19— 4 | 20— 0 | 20— 7 | 21— 2 |
| 2 x 14 | 12 | 21— 3 | 22— 7 | 23—10 | 24—10 | 24— 0 | 25— 4 | 26— 6 | 27— 9 | 28—10 | 30— 0 | | | | |
| | 16 | 19— 6 | 20—10 | 21—10 | 22—10 | 21— 1 | 22— 3 | 23— 4 | 24— 5 | 25— 5 | 26— 4 | 27— 3 | 28— 1 | 29— 0 | 29—10 |
| | 24 | 17— 3 | 18— 4 | 19— 4 | 20— 1 | 17— 6 | 18— 6 | 19— 5 | 20— 3 | 21— 0 | 21—10 | 22— 7 | 23— 5 | 24— 1 | 24—10 |
| 3 x 6 | 12 | 10— 6 | 11— 3 | 11—10 | 12— 4 | 13— 0 | 13— 9 | 14— 5 | 15— 0 | 15— 7 | 16— 3 | 16—10 | 17— 4 | 17—11 | 18— 5 |
| | 16 | 9— 7 | 10— 4 | 10—10 | 11— 4 | 11— 5 | 12— 0 | 12— 7 | 13— 1 | 13— 9 | 14— 3 | 14— 9 | 15— 3 | 15— 7 | 16— 1 |
| | 24 | 8— 6 | 9— 0 | 9— 6 | 9—11 | 9— 5 | 9—11 | 10— 5 | 10—11 | 11— 4 | 11— 9 | 12— 1 | 12— 6 | 12—11 | 13— 4 |
| 3 x 8 | 12 | 13—11 | 14—10 | 15— 7 | 16— 4 | 17— 1 | 18— 0 | 18—11 | 19— 9 | 20— 7 | 21— 4 | 22— 0 | 22—10 | 23— 6 | 24— 1 |
| | 16 | 12—10 | 13— 6 | 14— 4 | 14—11 | 15— 0 | 15—10 | 16— 7 | 17— 4 | 18— 1 | 18— 9 | 19— 4 | 20— 0 | 20— 7 | 21— 3 |
| | 24 | 11— 3 | 12— 0 | 12— 7 | 13— 3 | 12— 5 | 13— 1 | 13— 9 | 14— 5 | 15— 0 | 15— 6 | 16— 0 | 16— 7 | 17— 1 | 17— 6 |
| 3 x 10 | 12 | 17— 6 | 18— 6 | 19— 6 | 20— 5 | 21— 4 | 22— 5 | 23— 7 | 24— 7 | 25— 7 | 26— 7 | 27— 6 | 28— 5 | 29— 4 | 30— 0 |
| | 16 | 16— 1 | 17— 0 | 17—11 | 18—10 | 18—10 | 19—10 | 20—10 | 21— 9 | 22— 7 | 23— 5 | 24— 3 | 25— 0 | 25—10 | 26— 7 |
| | 24 | 14— 3 | 15— 1 | 15—10 | 16— 7 | 15— 7 | 16— 6 | 17— 4 | 18— 0 | 18—10 | 19— 6 | 20— 1 | 20—10 | 21— 5 | 22— 1 |

**NOTE.**—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof covering (2.5 pounds per square foot). (Group I.)
Live load—40 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR RAFTERS AND ROOF JOISTS—UNIFORMLY LOADED

Any slope. Live Load 20 Pounds per Square Foot

| Size of Joists or Rafters (Nominal) in Inches | Spacing of Joists or Rafters Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS OR FROM PLATE TO RIDGE (Without Collar Beams) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 6— 7 | 7— 0 | 7— 5 | 7— 9 | 8— 1 | 8— 7 | 9— 0 | 9— 5 | 9— 8 | 10— 1 | 10— 6 | 10— 9 | 11— 1 | 11— 6 |
| | 16 | 6— 0 | 6— 5 | 6— 9 | 7— 1 | 7— 1 | 7— 5 | 7— 9 | 8— 1 | 8— 6 | 8— 9 | 9— 1 | 9— 5 | 9— 8 | 10— 0 |
| | 24 | 5— 4 | 5— 7 | 5—10 | 6— 2 | 5— 9 | 6— 2 | 6— 5 | 6— 8 | 7— 0 | 7— 2 | 7— 6 | 7— 9 | 8— 0 | 8— 2 |
| 2 x 6 | 12 | 10— 2 | 10—10 | 11— 5 | 12— 0 | 12— 5 | 13— 1 | 13— 9 | 14— 4 | 15— 0 | 15— 6 | 16— 0 | 16— 7 | 17— 1 | 17— 7 |
| | 16 | 9— 4 | 9—10 | 10— 6 | 10—10 | 10—10 | 11— 5 | 12— 0 | 12— 7 | 13— 1 | 13— 7 | 14— 1 | 14— 6 | 15— 0 | 15— 5 |
| | 24 | 8— 2 | 8— 8 | 9— 2 | 9— 7 | 9— 0 | 9— 5 | 9—10 | 10— 4 | 10— 9 | 11— 2 | 11— 7 | 12— 0 | 12— 4 | 12— 8 |
| 2 x 8 | 12 | 13— 6 | 14— 5 | 15— 1 | 15— 9 | 16— 5 | 17— 4 | 18— 1 | 18—10 | 19— 8 | 20— 5 | 21— 1 | 21— 9 | 22— 6 | 23— 2 |
| | 16 | 12— 5 | 13— 2 | 13—10 | 14— 6 | 14— 5 | 15— 2 | 15—10 | 16— 7 | 17— 4 | 17—10 | 18— 7 | 19— 2 | 19— 9 | 20— 4 |
| | 24 | 10—10 | 11— 7 | 12— 2 | 12— 9 | 11—10 | 12— 6 | 13— 1 | 13— 8 | 14— 4 | 14— 9 | 15— 4 | 15— 9 | 16— 4 | 16— 9 |
| 2 x 10 | 12 | 17— 0 | 18— 1 | 19— 0 | 19—10 | 20— 6 | 21— 7 | 22— 7 | 23— 8 | 24— 7 | 25— 6 | 26— 6 | 27— 4 | 28— 2 | 29— 0 |
| | 16 | 15— 7 | 16— 7 | 17— 6 | 18— 4 | 18— 4 | 19— 4 | 20— 2 | 21— 1 | 21—10 | 22— 8 | 23— 6 | 24— 4 | 25— 1 | 25— 9 |
| | 24 | 13— 9 | 14— 7 | 15— 5 | 16— 1 | 15— 0 | 15— 9 | 16— 6 | 17— 2 | 18— 0 | 18— 8 | 19— 4 | 19—10 | 20— 6 | 21— 1 |
| 2 x 12 | 12 | 20— 5 | 21— 8 | 22— 9 | 23—10 | 24— 6 | 25— 9 | 27— 1 | 28— 4 | 29— 5 | 30— 0 | | | | |
| | 16 | 18— 9 | 20— 6 | 21— 0 | 22— 0 | 21— 7 | 22— 9 | 23—10 | 25— 0 | 26— 0 | 27— 0 | 27—10 | 28— 9 | 29— 8 | 30— 0 |
| | 24 | 16— 7 | 17— 7 | 18— 7 | 19— 5 | 18— 0 | 19— 0 | 19—10 | 20— 9 | 21— 7 | 22— 5 | 23— 2 | 24— 0 | 24— 8 | 25— 5 |
| 2 x 14 | 12 | 23— 9 | 25— 3 | 26— 6 | 27— 9 | 28— 4 | 29—10 | 30— 0 | | | | | | | |
| | 16 | 22—11 | 24— 4 | 25— 7 | 26—10 | 26—11 | 28— 4 | 29— 9 | 30— 0 | | | | | | |
| | 24 | 19— 5 | 20— 7 | 21— 9 | 22— 9 | 21— 0 | 22— 1 | 23— 3 | 24— 3 | 25— 3 | 26— 1 | 27— 0 | 27—11 | 28—10 | 29— 7 |
| 3 x 6 | 12 | 11—10 | 12— 7 | 13— 3 | 13—10 | 15— 6 | 16— 4 | 17— 1 | 17—11 | 18— 7 | 19— 4 | 20— 0 | 20— 7 | 21— 4 | 21—11 |
| | 16 | 10—11 | 11— 7 | 12— 3 | 12— 9 | 13— 7 | 14— 5 | 15— 1 | 15— 8 | 16— 5 | 17— 0 | 17— 7 | 18— 3 | 18— 9 | 19— 4 |
| | 24 | 9— 7 | 10— 3 | 10— 9 | 11— 3 | 11— 4 | 11—11 | 12— 6 | 13— 0 | 13— 7 | 14— 1 | 14— 7 | 15— 0 | 15— 6 | 16—10 |
| 3 x 8 | 12 | 15— 7 | 16— 7 | 17— 5 | 18— 3 | 20— 3 | 21— 4 | 22— 4 | 23— 4 | 24— 5 | 25— 3 | 26— 1 | 26—11 | 27— 9 | 28— 6 |
| | 16 | 14— 4 | 15— 3 | 16— 1 | 16—10 | 17—11 | 18—10 | 19— 9 | 20— 7 | 21— 7 | 22— 4 | 23— 1 | 23—10 | 24— 6 | 25— 4 |
| | 24 | 12— 9 | 13— 6 | 14— 3 | 14—11 | 14—11 | 15— 9 | 16— 5 | 17— 3 | 18— 0 | 18— 6 | 19— 3 | 19—10 | 20— 5 | 21— 0 |
| 3 x 10 | 12 | 19— 5 | 20— 9 | 21—10 | 22—10 | 25— 1 | 26— 5 | 27— 9 | 28—11 | 30— 0 | | | | | |
| | 16 | 18— 0 | 19— 1 | 20— 1 | 21— 1 | 22— 4 | 23— 6 | 24— 7 | 25— 9 | 26—10 | 27—10 | 28— 9 | 29— 9 | 30— 0 | |
| | 24 | 16— 0 | 17— 0 | 17—11 | 18— 9 | 18— 7 | 19— 7 | 20— 7 | 21— 6 | 22— 5 | 23— 3 | 24— 1 | 24—10 | 25— 7 | 26— 5 |
| 3 x 12 | 12 | 23— 3 | 24— 9 | 26— 0 | 27— 3 | 29— 9 | 30— 0 | | | | | | | | |
| | 16 | 21— 6 | 22—11 | 24— 1 | 25— 3 | 26— 6 | 27—11 | 29— 4 | 30— 0 | | | | | | |
| | 24 | 19— 3 | 20— 5 | 21— 5 | 22— 5 | 22— 4 | 23— 6 | 24— 9 | 25— 9 | 26—10 | 27—10 | 28—10 | 29— 9 | 30— 0 | |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof covering (8 pounds per square foot). (Group II.)
Live load—20 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR RAFTERS AND ROOF JOISTS—UNIFORMLY LOADED

Any Slope. Live Load 30 Pounds per Square Foot.

| Size of Joists or Rafters (Nominal) in Inches | Spacing of Joists or Rafters Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS OR FROM PLATE TO RIDGE (Without Collar Beams) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 4 | 12 | 6— 1 | 6— 6 | 6—10 | 7— 1 | 7— 1 | 7— 6 | 7—10 | 8— 2 | 8— 6 | 8—10 | 9— 2 | 9— 6 | 9— 9 | 10— 0 |
| | 16 | 5— 7 | 5—11 | 6— 2 | 6— 6 | 6— 2 | 6— 6 | 6— 9 | 7— 2 | 7— 5 | 7— 8 | 7—11 | 8— 3 | 8— 6 | 8— 9 |
| | 24 | 4—10 | 5— 1 | 5— 5 | 5— 8 | 5— 0 | 5— 3 | 5— 7 | 5—10 | 6— 1 | 6— 4 | 6— 7 | 6— 9 | 6—11 | 7— 2 |
| 2 x 6 | 12 | 9— 5 | 10— 0 | 10— 6 | 11— 0 | 10—11 | 11— 6 | 12— 0 | 12— 7 | 13— 1 | 13— 7 | 14— 1 | 14— 7 | 15— 0 | 15— 5 |
| | 16 | 8— 7 | 9— 1 | 9— 7 | 10— 0 | 9— 5 | 10— 0 | 10— 6 | 11— 0 | 11— 5 | 11—10 | 12— 3 | 12— 8 | 13— 1 | 13— 6 |
| | 24 | 7— 6 | 8— 0 | 8— 5 | 8—10 | 7—10 | 8— 4 | 8— 8 | 9— 0 | 9— 5 | 9— 9 | 10— 1 | 10— 5 | 10— 9 | 11— 1 |
| 2 x 8 | 12 | 12— 6 | 13— 3 | 14— 0 | 14— 6 | 14— 5 | 15— 2 | 15—11 | 16— 8 | 17— 4 | 17—11 | 18— 7 | 19— 3 | 19—10 | 20— 5 |
| | 16 | 11— 6 | 12— 1 | 12— 9 | 13— 4 | 12— 7 | 13— 3 | 13—11 | 14— 7 | 15— 1 | 15— 8 | 16— 3 | 16—10 | 17— 4 | 17—10 |
| | 24 | 10— 0 | 10— 8 | 11— 3 | 11— 9 | 10— 5 | 11— 0 | 11— 6 | 12— 0 | 12— 6 | 12—11 | 13— 5 | 13—10 | 14— 3 | 14— 8 |
| 2 x 10 | 12 | 15— 8 | 16— 8 | 17— 7 | 18— 4 | 18— 1 | 19— 0 | 20— 0 | 20—11 | 21— 9 | 22— 7 | 23— 4 | 24— 1 | 24—10 | 25— 7 |
| | 16 | 14— 4 | 15— 3 | 16— 1 | 16— 9 | 15—10 | 16— 8 | 17— 6 | 18— 4 | 19— 0 | 19— 9 | 20— 6 | 21— 2 | 21—10 | 22— 5 |
| | 24 | 12— 9 | 13— 6 | 14— 3 | 14—10 | 13— 2 | 13—11 | 14— 7 | 15— 3 | 15—11 | 16— 6 | 17— 0 | 17— 7 | 18— 1 | 18— 8 |
| 2 x 12 | 12 | 18—10 | 20— 0 | 21— 1 | 22— 0 | 21— 8 | 22—10 | 24— 0 | 25— 0 | 26— 0 | 27— 0 | 28— 0 | 28—11 | 29—10 | 30— 0 |
| | 16 | 17— 5 | 18— 4 | 19— 4 | 20— 3 | 19— 0 | 20— 1 | 21— 0 | 22— 0 | 22—11 | 23— 9 | 24— 7 | 25— 5 | 26— 2 | 26—11 |
| | 24 | 15— 3 | 16— 2 | 17— 0 | 17—11 | 15— 9 | 16— 8 | 17— 5 | 18— 3 | 18—10 | 19— 9 | 20— 4 | 21— 0 | 21— 8 | 22— 4 |
| 2 x 14 | 12 | 21—11 | 23— 4 | 24— 6 | 25— 7 | 25— 1 | 26— 6 | 27— 9 | 29— 0 | 30— 0 | | | | | |
| | 16 | 20— 1 | 21— 5 | 22— 6 | 23— 7 | 22— 1 | 23— 4 | 24— 6 | 25— 7 | 26— 7 | 27— 7 | 28— 7 | 29— 6 | 30— 0 | |
| | 24 | 17—10 | 18—11 | 19—11 | 20—10 | 18— 5 | 19— 5 | 20— 4 | 21— 3 | 22— 1 | 23— 0 | 23— 9 | 24— 6 | 25— 4 | 26— 0 |
| 3 x 6 | 12 | 10—11 | 11— 7 | 12— 3 | 12— 9 | 13— 7 | 14— 5 | 15— 1 | 15— 9 | 16— 5 | 17— 0 | 17— 7 | 18— 3 | 18— 9 | 19— 4 |
| | 16 | 10— 0 | 10— 7 | 11— 1 | 11— 7 | 12— 0 | 12— 7 | 13— 3 | 13—10 | 14— 5 | 14—11 | 15— 5 | 15—11 | 16— 5 | 16—11 |
| | 24 | 8—10 | 9— 4 | 9—10 | 10— 4 | 9—11 | 10— 5 | 10—11 | 11— 5 | 11—11 | 12— 4 | 12—10 | 13— 3 | 13— 7 | 14— 0 |
| 3 x 8 | 12 | 14— 4 | 15— 3 | 16— 1 | 16—10 | 17—11 | 18—10 | 19— 9 | 20— 7 | 21— 7 | 22— 4 | 23— 1 | 23—10 | 24— 7 | 25— 4 |
| | 16 | 13— 3 | 14— 0 | 14—10 | 15— 5 | 15— 9 | 16— 7 | 17— 5 | 18— 3 | 19— 0 | 19— 7 | 20— 4 | 21— 0 | 21— 7 | 22— 3 |
| | 24 | 11— 7 | 12— 4 | 15— 0 | 13— 7 | 13— 0 | 13— 7 | 14— 5 | 15— 1 | 15—10 | 16— 4 | 16—11 | 17— 5 | 17—11 | 18— 5 |
| 3 x 10 | 12 | 18— 0 | 19— 1 | 20— 1 | 21— 1 | 22— 4 | 23— 6 | 24— 7 | 25— 9 | 26—10 | 27—10 | 28—10 | 29— 9 | 30— 0 | |
| | 16 | 16— 7 | 17— 7 | 18— 6 | 19— 5 | 19— 9 | 20— 9 | 21— 9 | 22— 9 | 23— 7 | 24— 6 | 25— 5 | 26— 3 | 27— 0 | 27—10 |
| | 24 | 14— 9 | 15— 7 | 16— 5 | 17— 1 | 16— 5 | 17— 4 | 18— 1 | 18—11 | 19— 9 | 20— 5 | 21— 3 | 21—10 | 22— 6 | 23— 3 |
| 3 x 12 | 12 | 21—10 | 23— 1 | 24— 4 | 25— 6 | 27— 0 | 28— 5 | 29—10 | 30— 0 | | | | | | |
| | 16 | 20— 0 | 21— 4 | 22— 5 | 23— 5 | 23—10 | 25— 1 | 26— 4 | 27— 6 | 28— 7 | 29— 9 | 30— 0 | | | |
| | 24 | 17— 9 | 18—11 | 19—11 | 20—10 | 19—10 | 20—11 | 21—11 | 22—11 | 23—11 | 24— 9 | 25— 7 | 26— 6 | 27— 4 | 28— 1 |
| 3 x 14 | 12 | 25— 0 | 26— 7 | 28— 0 | 29— 4 | 30— 0 | | | | | | | | | |
| | 16 | 23— 3 | 24— 7 | 25—11 | 27— 1 | 27— 4 | 28—10 | 30— 0 | | | | | | | |
| | 24 | 20— 7 | 21—11 | 23— 0 | 24— 1 | 22—11 | 24— 1 | 25— 4 | 26— 5 | 27— 6 | 28— 6 | 29— 6 | 30— 0 | | |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof covering (8 pounds per square foot). (Group II.)
Live load—30 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR ROOF JOISTS—UNIFORMLY LOADED

Any Slope. Live Load 40 Pounds per Square Foot

MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS OR FROM PLATE TO RIDGE (Without Collar Beams)

| Size of Joists or Rafters (Nominal) in Inches | Spacing of Joists or Rafters Center to Center in Inches | Limited by Deflection of 1/360 of the Span. Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | Determined by Bending. Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 8— 8 | 9— 4 | 9— 9 | 10— 2 | 9— 9 | 10— 4 | 10— 9 | 11— 4 | 11— 9 | 12— 2 | 12— 8 | 13— 1 | 13— 6 | 13—10 |
| | 16 | 7—10 | 8— 5 | 8—10 | 9— 4 | 8— 7 | 9— 0 | 9— 5 | 9—10 | 10— 2 | 10— 7 | 11— 0 | 11— 5 | 11— 8 | 12— 1 |
| | 24 | 7— 0 | 7— 5 | 7— 9 | 8— 2 | 7— 0 | 7— 5 | 7— 9 | 8— 1 | 8— 5 | 8— 8 | 9— 0 | 9— 4 | 9— 7 | 9—10 |
| 2 x 8 | 12 | 11— 7 | 12— 4 | 13— 0 | 13— 6 | 13— 0 | 13— 8 | 14— 4 | 15— 0 | 15— 7 | 16— 2 | 16— 9 | 17— 4 | 17— 9 | 18— 5 |
| | 16 | 10— 7 | 11— 2 | 11— 9 | 12— 5 | 11— 4 | 12— 0 | 12— 6 | 13— 1 | 13— 7 | 14— 1 | 14— 7 | 15— 1 | 15— 7 | 16— 0 |
| | 24 | 9— 4 | 9—10 | 10— 5 | 10—10 | 9— 4 | 9— 9 | 10— 4 | 10— 9 | 11— 2 | 11— 7 | 12— 0 | 12— 5 | 12— 9 | 13— 2 |
| 2 x 10 | 12 | 14— 7 | 15— 6 | 16— 4 | 17— 1 | 16— 4 | 17— 2 | 18— 0 | 18— 9 | 19— 7 | 20— 4 | 21— 1 | 21— 9 | 22— 5 | 23— 1 |
| | 16 | 13— 4 | 14— 2 | 14—10 | 15— 7 | 14— 4 | 15— 1 | 15— 9 | 16— 6 | 17— 2 | 17— 9 | 18— 5 | 19— 0 | 19— 7 | 20— 2 |
| | 24 | 11— 8 | 12— 6 | 13— 1 | 13— 8 | 11— 8 | 12— 5 | 13— 0 | 13— 7 | 14— 1 | 14— 8 | 15— 2 | 15— 8 | 16— 2 | 16— 8 |
| 2 x 12 | 12 | 17— 7 | 18— 8 | 19— 8 | 20— 7 | 19— 7 | 20— 8 | 21— 8 | 22— 7 | 23— 7 | 24— 5 | 25— 4 | 26— 1 | 27— 0 | 27— 8 |
| | 16 | 16— 1 | 17— 1 | 18— 0 | 18— 9 | 17— 2 | 18— 1 | 19— 0 | 19— 9 | 20— 7 | 21— 5 | 22— 2 | 22—10 | 23— 7 | 24— 4 |
| | 24 | 14— 2 | 15— 1 | 15—10 | 16— 7 | 14— 2 | 15— 0 | 15— 8 | 16— 5 | 17— 1 | 17— 8 | 18— 4 | 18—10 | 19— 6 | 20— 1 |
| 2 x 14 | 12 | 20— 6 | 21—10 | 23— 0 | 24— 0 | 22—10 | 24— 0 | 25— 3 | 26— 4 | 27— 5 | 28— 5 | 29— 5 | 30— 0 | | |
| | 16 | 18—10 | 20— 0 | 21— 1 | 22— 1 | 20— 0 | 21— 1 | 22— 1 | 23— 1 | 24— 1 | 25— 0 | 25—11 | 26— 9 | 27— 6 | 28— 4 |
| | 24 | 16— 7 | 17— 9 | 18— 7 | 19— 5 | 16— 7 | 17— 6 | 18— 5 | 19— 5 | 19—11 | 20— 9 | 21— 5 | 22— 1 | 22—10 | 23— 6 |
| 3 x 6 | 12 | 10— 3 | 10—10 | 11— 5 | 11—11 | 12— 4 | 13— 0 | 13— 7 | 14— 3 | 14—10 | 15— 5 | 15—11 | 16— 5 | 16—11 | 17— 5 |
| | 16 | 9— 4 | 9—11 | 10— 5 | 10—11 | 10—10 | 11— 5 | 11—11 | 12— 5 | 13— 0 | 13— 6 | 13—11 | 14— 5 | 14—10 | 15— 3 |
| | 24 | 8— 3 | 8— 9 | 9— 3 | 9— 7 | 8—11 | 9— 5 | 9—10 | 10— 3 | 10— 9 | 11— 1 | 11— 6 | 11—10 | 12— 3 | 12— 7 |
| 3 x 8 | 12 | 13— 5 | 14— 4 | 15— 1 | 15— 9 | 16— 3 | 17— 1 | 17—11 | 18— 9 | 19— 7 | 20— 3 | 20—11 | 21— 7 | 22— 4 | 22—11 |
| | 16 | 12— 4 | 13— 1 | 13—10 | 14— 5 | 14— 3 | 15— 0 | 15— 9 | 16— 5 | 17— 3 | 17— 9 | 18— 5 | 18—11 | 19— 6 | 20— 1 |
| | 24 | 10—11 | 11— 6 | 12— 1 | 12— 9 | 11— 9 | 12— 5 | 13— 0 | 13— 7 | 14— 3 | 14— 9 | 15— 3 | 15— 9 | 16— 3 | 16— 7 |
| 3 x 10 | 12 | 16—11 | 17—11 | 18—11 | 19—10 | 20— 4 | 21— 5 | 22— 5 | 23— 5 | 24— 4 | 25— 4 | 26— 3 | 27— 0 | 27—10 | 28— 9 |
| | 16 | 15— 6 | 16— 6 | 17— 5 | 18— 1 | 17—10 | 18—10 | 19— 9 | 20— 7 | 21— 5 | 22— 3 | 23— 0 | 23—10 | 24— 6 | 25— 3 |
| | 24 | 13— 9 | 14— 6 | 15— 4 | 16— 0 | 14—10 | 15— 7 | 16— 5 | 17— 1 | 17—10 | 18— 5 | 19— 1 | 19— 9 | 20— 4 | 20—11 |
| 3 x 12 | 12 | 20— 4 | 21— 6 | 22— 9 | 23— 9 | 24— 3 | 25— 6 | 26—10 | 27—11 | 29— 1 | 30— 0 | | | | |
| | 16 | 18— 7 | 19—10 | 20—10 | 21—10 | 21— 5 | 22— 6 | 23— 7 | 24— 9 | 25— 9 | 26— 7 | 27— 7 | 28— 6 | 29— 5 | 30— 0 |
| | 24 | 16— 6 | 17— 6 | 18— 5 | 19— 4 | 17—10 | 18— 9 | 19— 7 | 20— 6 | 21— 5 | 22— 3 | 23— 0 | 23— 9 | 24— 5 | 25— 1 |
| 3 x 14 | 12 | 23— 7 | 25— 1 | 26— 5 | 27— 7 | 28— 1 | 29— 7 | 30— 0 | | | | | | | |
| | 16 | 21— 9 | 23— 1 | 24— 4 | 25— 5 | 24—10 | 26— 3 | 27— 5 | 28— 9 | 29—10 | 30— 0 | | | | |
| | 24 | 19— 4 | 20— 6 | 21— 7 | 22— 6 | 20— 9 | 21—11 | 22—11 | 23—11 | 24—11 | 25—11 | 26—10 | 27— 7 | 28— 6 | 29— 4 |

NOTE.—The lengths are based on:
When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."
When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof covering (8 pounds per square foot). (Group II.)
Live load—40 pounds per square foot of roof surface considered as acting normal to the surface.

## MAXIMUM SPANS FOR ROOF JOISTS—UNIFORMLY LOADED

Any slope. Live Load 50 Pounds per Square Foot

| Size of Joists or Rafters (Nominal) in Inches | Spacing of Joists or Rafters Center to Center in Inches | MAXIMUM ALLOWABLE LENGTHS BETWEEN SUPPORTS OR FROM PLATE TO RIDGE (Without Collar Beams) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Limited by Deflection of 1/360 of the Span** Having determined by reference to the building code or the table on page 1 the allowable **modulus of elasticity** in pounds per square inch for the species of timber used, refer to the column below with the corresponding value to determine span. | | | | **Determined by Bending** Having determined by reference to the building code or the table on page 1 the allowable **extreme fibre stress in bending** in pounds per square inch for the species and grade of lumber used, refer to the column below with the corresponding value to determine maximum safe span. | | | | | | | | | |
| | | E=1,000,000 | E=1,200,000 | E=1,400,000 | E=1,600,000 | f=900 | f=1,000 | f=1,100 | f=1,200 | f=1,300 | f=1,400 | f=1,500 | f=1,600 | f=1,700 | f=1,800 |
| | | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. | Ft. Ins. |
| 2 x 6 | 12 | 8— 4 | 8—10 | 9— 4 | 9— 9 | 9— 0 | 9— 7 | 10— 0 | 10— 6 | 10—11 | 11— 4 | 11— 9 | 12— 1 | 12— 6 | 12—10 |
| | 16 | 7— 7 | 8— 0 | 8— 5 | 8—10 | 7—11 | 8— 3 | 8— 8 | 9— 0 | 9— 5 | 9—10 | 10— 2 | 10— 6 | 10—10 | 11— 1 |
| | 24 | 6— 8 | 7— 1 | 7— 5 | 7— 9 | 6— 6 | 6— 9 | 7— 2 | 7— 6 | 7—10 | 8— 1 | 8— 4 | 8— 8 | 8—11 | 9— 2 |
| 2 x 8 | 12 | 11— 0 | 11— 9 | 12— 4 | 12—11 | 12— 0 | 12— 8 | 13— 4 | 13—11 | 14— 6 | 15— 0 | 15— 7 | 16— 1 | 16— 7 | 17— 0 |
| | 16 | 10— 1 | 10— 8 | 11— 4 | 11— 9 | 10— 6 | 11— 0 | 11— 8 | 12— 1 | 12— 7 | 13— 1 | 13— 7 | 14— 0 | 14— 5 | 14—10 |
| | 24 | 8—10 | 9— 5 | 9—11 | 10— 5 | 8— 7 | 9— 0 | 9— 6 | 9—11 | 10— 4 | 10— 9 | 11— 1 | 11— 6 | 11—10 | 12— 2 |
| 2 x 10 | 12 | 14— 0 | 14— 9 | 15— 7 | 16— 4 | 15— 2 | 16— 0 | 16— 9 | 17— 6 | 18— 3 | 18—11 | 19— 7 | 20— 2 | 20—10 | 21— 5 |
| | 16 | 12— 9 | 13— 6 | 14— 3 | 14—10 | 13— 3 | 13—11 | 14— 8 | 15— 3 | 15—11 | 16— 6 | 17— 1 | 17— 8 | 18— 2 | 18— 9 |
| | 24 | 11— 2 | 11—11 | 12— 6 | 13— 1 | 10—10 | 11— 6 | 12— 0 | 12— 7 | 13— 1 | 13— 7 | 14— 1 | 14— 6 | 15— 0 | 15— 5 |
| 2 x 12 | 12 | 16— 9 | 17—10 | 18— 9 | 19— 8 | 18— 3 | 19— 2 | 20— 2 | 21— 0 | 21—11 | 22— 9 | 23— 6 | 24— 3 | 25— 0 | 25— 9 |
| | 16 | 15— 4 | 16— 4 | 17— 2 | 18— 0 | 15—11 | 16—10 | 17— 7 | 18— 5 | 19— 2 | 19— 9 | 20— 7 | 21— 3 | 21—11 | 22— 6 |
| | 24 | 13— 6 | 14— 4 | 15— 1 | 15—10 | 13— 2 | 13—10 | 14— 6 | 15— 2 | 15— 9 | 16— 5 | 17— 0 | 17— 6 | 18— 0 | 18— 7 |
| 2 x 14 | 12 | 19— 5 | 20— 9 | 21—10 | 22—10 | 21— 0 | 22— 3 | 23— 3 | 24— 4 | 25— 4 | 26— 3 | 27— 1 | 28— 0 | 28—11 | 29— 9 |
| | 16 | 17—10 | 19— 0 | 19—11 | 20—11 | 18— 5 | 19— 5 | 20— 5 | 21— 4 | 22— 3 | 23— 0 | 23—10 | 24— 7 | 25— 4 | 26— 1 |
| | 24 | 15— 9 | 16— 9 | 17— 5 | 18— 4 | 15— 3 | 16— 1 | 16—11 | 17— 7 | 18— 4 | 19— 0 | 19— 9 | 20— 4 | 21— 0 | 21— 7 |
| 3 x 6 | 12 | 9— 7 | 10— 3 | 10—10 | 11— 3 | 11— 4 | 12— 0 | 12— 6 | 13— 1 | 13— 7 | 14— 1 | 14— 7 | 15— 1 | 15— 7 | 16— 0 |
| | 16 | 8—10 | 9— 4 | 9—10 | 10— 4 | 9—11 | 10— 5 | 11— 0 | 11— 5 | 11—11 | 12— 4 | 12—10 | 13— 3 | 13— 7 | 14— 0 |
| | 24 | 7— 9 | 8— 3 | 8— 7 | 9— 0 | 8— 1 | 8— 7 | 9— 0 | 9— 5 | 9—10 | 10— 0 | 10— 6 | 10—11 | 11— 3 | 11— 6 |
| 3 x 8 | 12 | 12— 9 | 13— 6 | 14— 3 | 14—11 | 14—11 | 15— 9 | 16— 6 | 17— 3 | 18— 1 | 18— 7 | 19— 4 | 19—11 | 20— 6 | 21— 1 |
| | 16 | 11— 9 | 12— 5 | 13— 0 | 13— 7 | 13— 1 | 13—10 | 14— 6 | 15— 1 | 15—10 | 16— 4 | 16—11 | 17— 5 | 18— 0 | 18— 6 |
| | 24 | 10— 3 | 10—11 | 11— 6 | 12— 0 | 10—10 | 11— 5 | 11—11 | 12— 5 | 13— 1 | 13— 6 | 13—11 | 14— 5 | 14—10 | 15— 4 |
| 3 x 10 | 12 | 16— 1 | 17— 0 | 17—11 | 18—10 | 18—10 | 19—10 | 20—10 | 21— 9 | 22— 7 | 23— 5 | 24— 3 | 25— 0 | 25—10 | 26— 7 |
| | 16 | 14— 9 | 15— 7 | 16— 5 | 17— 3 | 16— 5 | 17— 4 | 18— 3 | 19— 0 | 19— 9 | 20— 6 | 21— 3 | 21—11 | 22— 7 | 23— 3 |
| | 24 | 12—11 | 13—10 | 14— 6 | 15— 1 | 13— 7 | 14— 4 | 15— 0 | 15— 9 | 16— 4 | 16—11 | 17— 6 | 18— 1 | 18— 9 | 19— 3 |
| 3 x 12 | 12 | 19— 3 | 20— 6 | 21— 6 | 22— 6 | 22— 5 | 23— 7 | 24— 9 | 25—10 | 26—11 | 27—11 | 28—11 | 29—10 | 30— 0 | |
| | 16 | 17— 9 | 18—10 | 19—10 | 20— 9 | 19— 9 | 20—10 | 21—10 | 22—10 | 23— 9 | 24— 7 | 25— 5 | 26— 4 | 27— 1 | 27—11 |
| | 24 | 15— 7 | 16— 7 | 17— 6 | 18— 3 | 16— 4 | 17— 3 | 18— 1 | 18—11 | 19— 7 | 20— 5 | 21— 1 | 21—10 | 22— 6 | 23— 1 |
| 3 x 14 | 12 | 22— 5 | 23—10 | 25— 1 | 26— 3 | 26— 0 | 27— 5 | 28— 9 | 30— 0 | | | | | | |
| | 16 | 20— 7 | 21—11 | 23— 1 | 24— 1 | 22—11 | 24— 3 | 25— 5 | 26— 6 | 27— 7 | 28— 7 | 29— 7 | 30— 0 | | |
| | 24 | 18— 3 | 19— 5 | 20— 5 | 21— 5 | 19— 1 | 20— 1 | 21— 1 | 22— 0 | 22—11 | 23—10 | 24— 7 | 25— 6 | 26— 3 | 27— 0 |

**NOTE.—The lengths are based on:**

When limited by deflection—
Maximum allowable deflection of 1/360 of span length.
Modulus of elasticity as noted for "E."

When determined by bending strength of the piece—
Allowable stress in extreme fibre in bending as noted for "f."

Dead load—Weight of roof joist.
Weight of roof sheathing (2.5 pounds per square foot).
Weight of roof covering (8 pounds per square foot). (Group II.)

Live load—50 pounds per square foot of roof surface considered as acting normal to the surface.

## PROPERTIES OF AMERICAN STANDARD YARD LUMBER AND TIMBER SIZES

| Size (Nominal in Inches) | American Standard Dressed Size Inches | Area of Section A=bd. Sq. In. | Weight per lin. foot* Pounds | Moment of Inertia $I=\frac{bd^3}{12}$ | Section Modulus $S=\frac{bd^2}{6}$ |
|---|---|---|---|---|---|
| 2 x 4 | 1⅝ x 3⅝ | 5.89 | 1.6 | 6.45 | 3.56 |
| 2 x 6 | 1⅝ x 5⅝ | 9.14 | 2.5 | 24.10 | 8.57 |
| 2 x 8 | 1⅝ x 7½ | 12.19 | 3.4 | 57.13 | 15.32 |
| 2 x 10 | 1⅝ x 9½ | 15.44 | 4.3 | 116.09 | 24.44 |
| 2 x 12 | 1⅝ x 11½ | 18.69 | 5.2 | 205.94 | 35.82 |
| 2 x 14 | 1⅝ x 13½ | 23.62 | 6.5 | 333.15 | 49.36 |
| 2 x 16 | 1⅝ x 15½ | 25.18 | 7.0 | 504.24 | 65.07 |
| 2 x 18 | 1⅝ x 17½ | 28.43 | 7.9 | 725.71 | 82.94 |
| 2 x 20 | 1⅝ x 19½ | 31.69 | 8.8 | 1004.05 | 102.98 |
| 3 x 4 | 2⅝ x 3⅝ | 9.51 | 2.6 | 10.42 | 5.75 |
| 3 x 6 | 2⅝ x 5⅝ | 14.76 | 4.2 | 38.93 | 13.84 |
| 3 x 8 | 2⅝ x 7½ | 19.68 | 5.7 | 92.28 | 24.60 |
| 3 x 10 | 2⅝ x 9½ | 24.93 | 7.2 | 187.55 | 39.48 |
| 3 x 12 | 2⅝ x 11½ | 30.18 | 8.8 | 332.69 | 57.86 |
| 3 x 14 | 2⅝ x 13½ | 35.43 | 10.3 | 538.21 | 79.73 |
| 3 x 16 | 2⅝ x 15½ | 40.68 | 11.3 | 814.60 | 105.11 |
| 3 x 18 | 2⅝ x 17½ | 45.94 | 12.8 | 1172.36 | 133.98 |
| 3 x 20 | 2⅝ x 19½ | 51.19 | 14.21 | 1622.00 | 166.36 |
| 4 x 4 | 3⅝ x 3⅝ | 13.14 | 3.6 | 14.38 | 7.94 |
| 4 x 6 | 3⅝ x 5⅝ | 20.39 | 5.7 | 53.76 | 19.11 |
| 4 x 8 | 3⅝ x 7½ | 27.18 | 7.5 | 127.44 | 33.98 |
| 4 x 10 | 3⅝ x 9½ | 34.43 | 9.6 | 258.99 | 54.52 |
| 4 x 12 | 3⅝ x 11½ | 41.68 | 11.6 | 459.42 | 79.90 |
| 4 x 14 | 3⅝ x 13½ | 48.93 | 13.6 | 743.23 | 110.11 |
| 4 x 16 | 3⅝ x 15½ | 56.18 | 15.6 | 1124.90 | 145.15 |
| 4 x 18 | 3⅝ x 17½ | 63.43 | 17.6 | 1618.96 | 185.02 |
| 4 x 20 | 3⅝ x 19½ | 70.69 | 19.6 | 2239.88 | 229.73 |
| 6 x 6 | 5½ x 5½ | 30.25 | 8.4 | 76.25 | 27.73 |
| 6 x 8 | 5½ x 7½ | 41.25 | 11.4 | 193.35 | 51.56 |
| 6 x 10 | 5½ x 9½ | 52.25 | 14.5 | 392.96 | 82.73 |
| 6 x 12 | 5½ x 11½ | 63.25 | 17.5 | 697.06 | 121.23 |
| 6 x 14 | 5½ x 13½ | 74.25 | 20.6 | 1127.66 | 167.06 |
| 6 x 16 | 5½ x 15½ | 85.25 | 23.6 | 1706.76 | 220.22 |
| 6 x 18 | 5½ x 17½ | 96.25 | 26.7 | 2456.36 | 280.73 |
| 6 x 20 | 5½ x 19½ | 107.25 | 29.8 | 3398.46 | 348.56 |
| 6 x 22 | 5½ x 21½ | 118.25 | 32.8 | 4555.05 | 423.73 |
| 8 x 8 | 7½ x 7½ | 56.25 | 15.6 | 263.67 | 70.31 |
| 8 x 10 | 7½ x 9½ | 71.25 | 19.8 | 535.85 | 112.81 |
| 8 x 12 | 7½ x 11½ | 86.25 | 23.9 | 950.55 | 165.31 |
| 8 x 14 | 7½ x 13½ | 101.25 | 28.0 | 1537.73 | 227.81 |
| 8 x 16 | 7½ x 15½ | 116.25 | 32.0 | 2327.42 | 300.31 |
| 8 x 18 | 7½ x 17½ | 131.25 | 36.4 | 3349.60 | 382.81 |
| 8 x 20 | 7½ x 19½ | 146.25 | 40.6 | 4634.30 | 475.31 |
| 8 x 22 | 7½ x 21½ | 161.25 | 44.8 | 6211.48 | 577.81 |
| 8 x 24 | 7½ x 23½ | 176.25 | 48.9 | 8111.17 | 690.31 |
| 10 x 10 | 9½ x 9½ | 90.25 | 25.0 | 678.75 | 142.89 |
| 10 x 12 | 9½ x 11½ | 109.25 | 30.3 | 1204.01 | 209.39 |
| 10 x 14 | 9½ x 13½ | 128.25 | 35.6 | 1947.78 | 288.56 |
| 10 x 16 | 9½ x 15½ | 147.25 | 40.9 | 2948.04 | 380.39 |
| 10 x 18 | 9½ x 17½ | 166.25 | 46.1 | 4242.80 | 484.89 |
| 10 x 20 | 9½ x 19½ | 185.25 | 51.4 | 5870.05 | 602.06 |
| 10 x 22 | 9½ x 21½ | 204.25 | 56.7 | 7867.81 | 731.89 |
| 10 x 24 | 9½ x 23½ | 223.25 | 62.0 | 10274.06 | 874.39 |
| 10 x 26 | 9½ x 25½ | 242.25 | 67.3 | 13126.81 | 1029.56 |
| 10 x 28 | 9½ x 27½ | 261.25 | 72.5 | 16465.24 | 1197.39 |
| 10 x 30 | 9½ x 29½ | 280.25 | 77.8 | 20323.79 | 1377.89 |
| 12 x 12 | 11½ x 11½ | 132.25 | 36.7 | 1457.50 | 253.47 |
| 12 x 14 | 11½ x 13½ | 155.25 | 43.1 | 2357.85 | 349.31 |
| 12 x 16 | 11½ x 15½ | 178.25 | 49.5 | 3568.70 | 460.48 |
| 12 x 18 | 11½ x 17½ | 201.25 | 55.9 | 5136.49 | 586.98 |
| 12 x 20 | 11½ x 19½ | 224.25 | 62.3 | 7105.90 | 728.81 |
| 12 x 22 | 11½ x 21½ | 247.25 | 68.7 | 9524.24 | 885.98 |
| 12 x 24 | 11½ x 23½ | 270.25 | 75.0 | 12437.08 | 1058.47 |
| 12 x 26 | 11½ x 25½ | 293.25 | 81.4 | 15890.42 | 1246.31 |
| 12 x 28 | 11½ x 27½ | 316.25 | 87.8 | 19932.58 | 1449.47 |
| 12 x 30 | 11½ x 29½ | 339.25 | 94.2 | 24602.61 | 1667.97 |
| 14 x 14 | 13½ x 13½ | 182.25 | 50.6 | 2767.92 | 410.06 |
| 14 x 16 | 13½ x 15½ | 209.25 | 58.1 | 4189.36 | 540.56 |
| 14 x 18 | 13½ x 17½ | 236.25 | 65.6 | 6029.29 | 689.06 |
| 14 x 20 | 13½ x 19½ | 263.25 | 73.1 | 8341.73 | 855.56 |
| 14 x 22 | 13½ x 21½ | 290.25 | 80.6 | 11180.67 | 1040.06 |
| 14 x 24 | 13½ x 23½ | 317.25 | 88.1 | 14600.10 | 1242.56 |
| 14 x 26 | 13½ x 25½ | 344.25 | 95.6 | 18654.04 | 1463.06 |
| 14 x 28 | 13½ x 27½ | 371.25 | 103.1 | 23398.73 | 1701.56 |
| 14 x 30 | 13½ x 29½ | 398.25 | 110.6 | 28881.42 | 1958.06 |
| 16 x 16 | 15½ x 15½ | 240.25 | 66.7 | 4809.98 | 620.64 |
| 16 x 18 | 15½ x 17½ | 271.25 | 75.3 | 6922.49 | 791.14 |
| 16 x 20 | 15½ x 19½ | 302.25 | 83.9 | 9577.50 | 982.31 |
| 16 x 22 | 15½ x 21½ | 333.25 | 92.5 | 12837.00 | 1194.14 |
| 16 x 24 | 15½ x 23½ | 364.25 | 101.2 | 16763.00 | 1426.64 |
| 16 x 26 | 15½ x 25½ | 395.25 | 109.8 | 21417.50 | 1679.81 |
| 16 x 28 | 15½ x 27½ | 426.25 | 118.4 | 26863.78 | 1953.64 |
| 16 x 30 | 15½ x 29½ | 457.25 | 127.0 | 33159.98 | 2248.14 |
| 18 x 18 | 17½ x 17½ | 306.25 | 85.0 | 7815.73 | 893.23 |
| 18 x 20 | 17½ x 19½ | 341.25 | 94.8 | 10813.33 | 1109.06 |
| 18 x 22 | 17½ x 21½ | 376.25 | 104.5 | 14493.43 | 1348.23 |
| 18 x 24 | 17½ x 23½ | 411.25 | 114.2 | 18926.02 | 1610.72 |
| 18 x 26 | 17½ x 25½ | 446.25 | 123.9 | 24181.11 | 1896.56 |
| 18 x 28 | 17½ x 27½ | 481.25 | 133.7 | 30331.62 | 2205.72 |
| 18 x 30 | 17½ x 29½ | 516.25 | 143.4 | 37438.79 | 2538.22 |
| 20 x 20 | 19½ x 19½ | 380.25 | 105.6 | 12049.49 | 1235.81 |
| 20 x 22 | 19½ x 21½ | 419.25 | 116.4 | 16149.86 | 1502.31 |
| 20 x 24 | 19½ x 23½ | 458.25 | 127.3 | 21089.04 | 1794.81 |
| 20 x 26 | 19½ x 25½ | 497.25 | 138.1 | 26944.73 | 2113.31 |
| 20 x 28 | 19½ x 27½ | 536.25 | 148.9 | 33798.17 | 2457.81 |
| 20 x 30 | 19½ x 29½ | 575.25 | 159.8 | 41717.61 | 2828.31 |
| 24 x 24 | 23½ x 23½ | 552.25 | 153.4 | 25414.96 | 2162.97 |
| 24 x 26 | 23½ x 25½ | 599.25 | 166.4 | 32471.80 | 2546.81 |
| 24 x 28 | 23½ x 27½ | 646.25 | 179.5 | 40731.06 | 2916.97 |
| 24 x 30 | 23½ x 29½ | 693.25 | 192.5 | 50274.98 | 3408.47 |

* Based on assumed average weight of 40 lbs. per cu. ft.

## AVERAGE WEIGHTS OF VARIOUS MATERIALS

(These weights were used to determine dead loads in obtaining the span lengths in tables.)

Finished floor ..... 2.5 lbs. per sq. ft.
Rough floor ..... 2.5 lbs. per sq. ft.
Sheathing ..... 2.5 lbs. per sq. ft.
Plaster ..... 10.0 lbs. per sq. ft.

### ROOFING

Group I—Assumed as 2.5 lbs. per sq. ft. including:

Shingles ..... 2.5 lbs. per sq. ft.
Copper sheets ..... 1.5 lbs. per sq. ft.
Copper tile ..... 1.75 lbs. per sq. ft.
Three-ply ready roofing ..... 1.00 lbs. per sq. ft.

Group II—Assumed as 8 lbs. per sq. ft. including:

Five-ply felt and gravel ..... 7 lbs. per sq. ft.
Slate, 3/16 inch ..... 7¼ lbs. per sq. ft.
Roman tile—new style—1 part ..... 8 lbs. per sq. ft.
Spanish tile—new style—1 part ..... 8 lbs. per sq. ft.
Ludowici tile ..... 8 lbs. per sq. ft.

## WHERE ADDITIONAL SPECIFIC LUMBER INFORMATION MAY BE OBTAINED

AS the publications of the National Lumber Manufacturers Association deal with lumber in general, it is suggested that those desiring additional information regarding the respective species of woods listed below should make requests for definitions, grading rules, and publications concerning the special advantages and characteristics of each species to the following member associations affiliated with the National Lumber Manufacturers Association:

CALIFORNIA REDWOOD ASSOCIATION,
San Francisco, Calif.

*Redwood*

CALIFORNIA WHITE AND SUGAR PINE MANUFACTURERS ASSOCIATION,
San Francisco, Calif.

*Sugar Pine, California White Pine, White Fir, Douglas Fir, Incense Cedar*

HARDWOOD MANUFACTURERS INSTITUTE,
Memphis, Tenn.

*Ash, Basswood, Beech, Birch, Cherry, Cypress, Chestnut, Cottonwood, Elm, Gum, Hickory, Maple, Magnolia, Oak, Poplar, Sycamore, Tupelo, Willow, Walnut, Aromatic Red Cedar*

NORTH CAROLINA PINE ASSOCIATION,
Norfolk, Va., and Macon, Ga.

*North Carolina Pine*

NORTHERN PINE MANUFACTURERS ASSOCIATION,
Minneapolis, Minn.

*Northern White Pine*
*Norway Pine, Eastern Spruce, Tamarack*

NORTHERN HEMLOCK AND HARDWOOD MANUFACTURERS ASSOCIATION,
Oshkosh, Wis.

*Hemlock, Birch, Maple, Basswood, Elm, Ash, Beech, Tamarack, White Pine*

SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION,
Jacksonville, Fla.

*Cypress, Tupelo*

SOUTHERN PINE ASSOCIATION,
New Orleans, La.

*Longleaf and Shortleaf Southern Pine*

WEST COAST LUMBERMEN'S ASSOCIATION,
Seattle, Wash., and Portland, Oreg.

*Douglas Fir, West Coast Hemlock, Sitka Spruce, Western Red Cedar, Port Orford Cedar*

WESTERN PINE MANUFACTURERS ASSOCIATION,
Portland, Oreg.

*Pondosa Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Cedar and Spruce*

### NATIONAL LUMBER MANUFACTURERS ASSOCIATION

Transportation Building
Washington, D. C.

FIELD OFFICES

| | | |
|---|---|---|
| New York | Chicago | San Francisco |
| Boston | Indianapolis | New Orleans |
| Pittsburgh | Minneapolis | Memphis |
| | Kansas City | |
| | Los Angeles | |

*Cooperating Organizations*

British Columbia Loggers Association.
British Columbia Lumber & Shingle Manufacturers Association.
Maple Flooring Manufacturers Association.
National-American Wholesale Lumber Association.
National Association of Wooden Box Manufacturers.
Oak Flooring Manufacturers Association of the United States.
Red Cedar Shingle Bureau.
Service Bureau—American Wood Preservers Association.
Wood Office Furniture Associates, Inc.

*Use Tree Mark American Standard Lumber*


*Tree Mark Lumber is Guaranteed*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Printed in U. S. A.

Supplement to Maximum Spans for Joists and Rafters, Chapter IV.

## WORKING STRESSES FOR STRUCTURAL LUMBER AND TIMBER

The economic utilization of lumber and timber demands design practices predicated on scientifically ascertained facts as to their physical and mechanical properties.

Working stresses appropriate to the qualities and characteristics of the material under its use conditions and which will allow full realization of the utility of the structural member within safe limits are provided herein for the species and grades of lumber commonly used for structural and load bearing purposes. The allowable working stresses given in Tables I, III and IV, and the safe column loads in Tables II, V and VI should be used as the basis for design with lumber unless the local building code otherwise provides.

The reference to minimum quality and the tables of allowable stresses and column loads are arranged in suitable form for inclusion in building codes and for the use of designers. The stresses given in these tables are, as indicated, either for manufacturers association Standard Commercial grades based on, or for lumber graded under, the structural grade examples given in the American Lumber Standards published by the Bureau of Standards, U. S. Department of Commerce in Simplified Practice Recommendation No. R. 16-29-Lumber - Fourth Edition. If lumber is used which is not of Association American Standard grades, or graded under the Structural grade examples, then proportionately lower stresses should be used.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION
Washington, D. C.

SECTION THE SIZE OF ALL WOOD STRUCTURAL MEMBERS shall be sufficient to carry the imposed loads safely and without exceeding the allowable working stresses as hereinafter specified. Where minimum sizes are required by this code, they refer to the nominal size, but in computations to determine the required size of lumber members, the net cross-section area or actual size shall be used and not the nominal size. American Standard dressed sizes shall be accepted as conforming with the corresponding nominal sizes required.

SECTION THE MAXIMUM ALLOWABLE WORKING STRESSES for lumber and timber in pounds per square inch of net cross-section area shall not exceed the values given in Tables I and II for the grades of the respective species, based on American Lumber Standards.

(a) STRESSES FOR GRADES NOT GIVEN IN THE TABLES shall be established by the Chief Building Inspector.

(b) STRESSES DUE TO DEAD AND LIVE LOADS, acting singly or in combination, but without wind loads, shall not exceed the allowable stress for the respective species. For stresses produced by wind loads only, or by a combination of wind loads and dead and live loads, the allowable stresses herein permitted may be increased 50% providing the resulting sections are not less than those required for dead and live loads alone.

(c) FOR DIRECT TENSION the same values as for extreme fibre stress in bending may be used.

(d) USING THE STRESSES FOR TIMBERS given in the following tables no allowance need be made for impact when the impact stress produced by any load does not exceed the live load stress.

(e) SHEARING STRESS FOR JOINT DETAILS may, for all grades, be taken as 50% greater than the horizontal shear values otherwise permitted.

(f) IN THE CASE OF JOISTS SUPPORTED on a ribbon board and spiked to the studding, the allowable stress in compression across the grain may be increased 50% above that specified.

SECTION THE MINIMUM QUALITY OF LUMBER AND TIMBER used structurally and for load bearing purposes shall be of commercial grades in nominal thicknesses, as follows:

(a) STUDDING, POSTS, AND SIMILAR LOAD BEARING MEMBERS shall be not lower in grade than No. 2 Common Dimension.

(b) BEAMS, GIRDERS, JOISTS, RAFTERS, PLANK, AND SIMILAR LOAD BEARING MEMBERS less than five inches thick shall be of a grade equal to or better than No. 1 Common Dimension.

(c) LUMBER FIVE INCHES (5") THICK AND THICKER shall be of a grade not lower than the lowest grade for which working stresses are given in Table I.

(d) LUMBER AND TIMBER TO BE ACCEPTED AS OF GRADES qualifying for working stresses higher than those permitted for the lowest grade provided for in Table I, shall bear an official grade mark or otherwise be identified by an acceptably authenticated certificate.

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## WORKING STRESSES

All computations to determine the required sizes of lumber members should be based on the net cross-sectional area or actual size. The size of members should be sufficient to carry the imposed load safely and without exceeding the allowable working stresses given in Table I.

TABLE I. ALLOWABLE UNIT STRESSES FOR STRUCTURAL LUMBER AND TIMBER

All Sizes, Dry Locations

| Species of Timber | Grade | Allowable Unit Stress in Pounds per Square Inch | | | | | |
|---|---|---|---|---|---|---|---|
| | | Extreme Fibre in Bending | | Maximum Horizontal Shear | Compression | | Modulus of Elasticity |
| | | Joist & Plank Sizes; 4" and less in thickness | Beam & Stringer Sizes; 5" & Thicker | | Parallel to grain (short columns) | Perpendicular to grain | |
| **Table I - A** | **Working Stresses for Manufacturers Association Standard Commercial Grades** | | | | | | |
| Douglas Fir, Coast Region | Dense Super-Structural | 2000 | 2000 | 120 | 1466 | 380 | 1,600,000 |
| | Super-Structural & Dense Structural | 1800 | 1800 | 105 | 1300 | 345 | 1,600,000 |
| | Structural | 1600 | 1600 | 90 | 1200 | 345 | 1,600,000 |
| | Common Structural | 1200 | 1400 | 84 | 1100 | 325 | 1,600,000 |
| Douglas Fir, Inland Empire | *Dense Super-Structural | 2000 | 2000 | 120 | 1466 | 380 | 1,600,000 |
| | *Dense Structural | 1800 | 1800 | 105 | 1300 | 345 | 1,600,000 |
| | No. 1 Common Dimension & Timbers | 1135 | 1135 | 70 | 1010 | 315 | 1,500,000 |
| Larch, Western | No. 1 Common Dimension & Timbers | 1135 | 1135 | 70 | 1010 | 325 | 1,300,000 |
| Pine, Southern Yellow | Extra Dense Select Structural | 2300 | 2300 | 200 | 1600 | 475 | 1,600,000 |
| | Select Structural | 2000 | 2000 | 175 | 1450 | 375 | 1,600,000 |
| | Extra Dense Heart | 2000 | 2000 | 175 | 1450 | 475 | 1,600,000 |
| | Dense Heart | 1800 | 1800 | 150 | 1300 | 375 | 1,600,000 |
| | Structural Sq. Edge & Sound | 1600 | 1600 | 125 | 1200 | 375 | 1,600,000 |
| | No. 1 Common | 1200 | 1200 | 100 | 1000 | 325 | 1,600,000 |
| Redwood | Super-Structural | 2133 | 1707 | 93 | 1422 | 267 | 1,200,000 |
| | Prime Structural | 1707 | 1494 | 82 | 1245 | 267 | 1,200,000 |
| | Select Structural | 1280 | 1322 | 70 | 1100 | 267 | 1,200,000 |
| | Heart Structural | 1024 | 1150 | 56 | 1000 | 267 | 1,200,000 |
| **Table I-B** | **Working Stresses for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards** | | | | | | |
| Cedar, Alaska | Select Structural | 1100 | 1100 | 90 | 800 | 250 | 1,200,000 |
| | Common Structural | 880 | 880 | 72 | 640 | 250 | 1,200,000 |
| Cedar, Northern & Southern White | Select Structural | 750 | 750 | 70 | 550 | 175 | 800,000 |
| | Common Structural | 600 | 600 | 56 | 440 | 175 | 800,000 |
| Cedar, Port Orford | Select Structural | 1100 | 1100 | 90 | 900 | 250 | 1,200,000 |
| | Common Structural | 880 | 880 | 72 | 720 | 250 | 1,200,000 |
| Cedar, Western Red | Select Structural | 900 | 900 | 80 | 700 | 200 | 1,000,000 |
| | Common Structural | 720 | 720 | 64 | 560 | 200 | 1,000,000 |
| Cypress, Southern | Select Structural | 1300 | 1300 | 100 | 1100 | 350 | 1,200,000 |
| | Common Structural | 1040 | 1040 | 80 | 880 | 350 | 1,200,000 |
| Douglas Fir, Rocky Mountain Region | Select Structural | 1100 | 1100 | 85 | 800 | 275 | 1,200,000 |
| | Common Structural | 880 | 880 | 68 | 640 | 275 | 1,200,000 |
| Fir, Balsam | Select Structural | 900 | 900 | 70 | 700 | 150 | 1,000,000 |
| | Common Structural | 720 | 720 | 56 | 560 | 150 | 1,000,000 |
| Fir, Golden, Noble, Silver, White, (Commercial White) | Select Structural | 1100 | 1100 | 70 | 700 | 300 | 1,100,000 |
| | Common Structural | 880 | 880 | 56 | 560 | 300 | 1,100,000 |
| Hemlock, Eastern | Select Structural | 1100 | 1100 | 70 | 700 | 300 | 1,100,000 |
| | Common Structural | 880 | 880 | 56 | 560 | 300 | 1,100,000 |
| Hemlock, West Coast | Select Structural | 1300 | 1300 | 75 | 900 | 300 | 1,400,000 |
| | Common Structural | 1040 | 1040 | 60 | 720 | 300 | 1,400,000 |
| Oak, Commercial White and Red | Select Structural | 1400 | 1400 | 125 | 1000 | 500 | 1,500,000 |
| | Common Structural | 1120 | 1120 | 100 | 800 | 500 | 1,500,000 |
| Pine, Calif., Idaho & No. White, Lodgepole, Pondosa, Sugar | Select Structural | 900 | 900 | 85 | 750 | 250 | 1,000,000 |
| | Common Structural | 720 | 720 | 68 | 600 | 250 | 1,000,000 |
| Pine, Norway | Select Structural | 1100 | 1100 | 85 | 800 | 300 | 1,200,000 |
| | Common Structural | 880 | 880 | 68 | 640 | 300 | 1,000,000 |
| Spruce, Englemann | Select Structural | 750 | 750 | 70 | 600 | 175 | 800,000 |
| | Common Structural | 600 | 600 | 56 | 480 | 175 | 800,000 |
| Spruce, Red, White, Sitka | Select Structural | 1100 | 1100 | 85 | 800 | 250 | 1,200,000 |
| | Common Structural | 880 | 880 | 68 | 640 | 250 | 1,200,000 |
| Tamarack, Eastern | Select Structural | 1200 | 1200 | 95 | 1000 | 300 | 1,300,000 |
| | Common Structural | 960 | 960 | 76 | 800 | 300 | 1,300,000 |

* When graded the same as corresponding grade of Coast Region Douglas Fir

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All Timber Columns, Posts and other vertical supports shall be of sufficient strength to safely support the combined live and dead loads transmitted to them.

Safe Loads and allowable working stresses in compression parallel to grain for timber columns shall not exceed in pounds per square inch the values given in the following table for the respective species, grade, and ratio of unsupported length to least dimension (L/d):

TABLE II - SAFE LOAD IN POUNDS PER SQUARE INCH OF CROSS-SECTIONAL AREA OF SQUARE AND RECTANGULAR TIMBER COLUMNS (Dry Locations)

| Species of Timber | Grade | * Ratio of Length to Least Dimension (L/d) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 & less lbs. | L/d 12 lbs. | L/d 14 lbs. | L/d 16 lbs. | L/d 18 lbs. | L/d 20 lbs. | L/d 25 lbs. | L/d 30 lbs. | L/d 35 lbs. | L/d 40 lbs. | L/d 50 lbs. |
| Table II - A | Allowable Column Loads for Manufacturers Association Standard Commercial Grades | | | | | | | | | | | |
| Douglas fir, Coast Region | Dense Super-Str. | 1466 | 1416 | 1373 | 1307 | 1215 | 1079 | 702 | 487 | 358 | 274 | 175 |
| | Super-Str. and Dense Structural | 1300 | 1264 | 1235 | 1189 | 1123 | 1027 | 702 | 487 | 358 | 274 | 175 |
| | Structural | 1200 | 1176 | 1152 | 1112 | 1059 | 986 | 702 | 487 | 358 | 274 | 175 |
| | Com. Structural | 1100 | 1079 | 1060 | 1032 | 992 | 937 | 702 | 487 | 358 | 274 | 175 |
| Douglas fir, Inland Empire | **Dense Super-Str. | 1466 | 1416 | 1373 | 1307 | 1215 | 1079 | 702 | 487 | 358 | 274 | 175 |
| | **Dense Structural | 1300 | 1264 | 1235 | 1189 | 1123 | 1027 | 702 | 487 | 358 | 274 | 175 |
| | No. 1 Com. Dimen. & Timbers | 1010 | 982 | 966 | 943 | 907 | 860 | 625 | 457 | 336 | 257 | 164 |
| Larch, western | No. 1 Com. Dimen. & Timbers | 1010 | 984 | 964 | 933 | 885 | 818 | 566 | 396 | 291 | 223 | 142 |
| Pine, Southern Yellow | Extra Dense Heart | 1450 | 1400 | 1355 | 1300 | 1195 | 1065 | 701 | 487 | 358 | 274 | 175 |
| | Dense heart | 1300 | 1265 | 1235 | 1190 | 1125 | 1027 | 701 | 487 | 358 | 274 | 175 |
| | Str. Sq. Edge & Sound | 1200 | 1174 | 1150 | 1110 | 1062 | 984 | 701 | 487 | 358 | 274 | 175 |
| | No. 1 Common | 1000 | 984 | 970 | 950 | 920 | 880 | 700 | 487 | 358 | 274 | 175 |
| Redwood | Super-Structural | 1422 | 1339 | 1272 | 1165 | 1023 | 822 | 526 | 365 | 268 | 206 | 132 |
| | Prime Structural | 1245 | 1139 | 1142 | 1073 | 971 | 822 | 526 | 365 | 268 | 206 | 132 |
| | Select Structural | 1100 | 1063 | 1029 | 979 | 907 | 807 | 526 | 365 | 268 | 206 | 132 |
| | Heart Structural | 1000 | 972 | 947 | 910 | 858 | 782 | 526 | 365 | 268 | 206 | 132 |
| Table II-B | Allowable Column Loads for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards | | | | | | | | | | | |
| Cedar, Alaska | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Cedar, Northern & Southern White | Select Structural | 545 | 540 | 530 | 516 | 496 | 468 | 351 | 244 | 179 | 137 | 88 |
| | Common Structural | 437 | 435 | 430 | 423 | 412 | 398 | 338 | 244 | 179 | 137 | 88 |
| Cedar, Port Orford | Select Structural | 890 | 879 | 861 | 834 | 796 | 741 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 715 | 709 | 700 | 686 | 667 | 639 | 521 | 365 | 268 | 206 | 132 |
| Cedar, Western Red | Select Structural | 693 | 686 | 674 | 656 | 629 | 592 | 438 | 304 | 224 | 171 | 110 |
| | Common Structural | 557 | 553 | 547 | 538 | 524 | 505 | 425 | 304 | 224 | 171 | 110 |
| Cypress, Southern | Select Structural | 1082 | 1063 | 1030 | 981 | 909 | 810 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 870 | 861 | 843 | 818 | 781 | 729 | 526 | 365 | 268 | 206 | 132 |
| Douglas fir, Rocky Mt. Type | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Fir, Balsam | Select Structural | 693 | 686 | 674 | 656 | 629 | 592 | 438 | 304 | 224 | 171 | 110 |
| | Common Structural | 557 | 553 | 547 | 538 | 524 | 505 | 425 | 304 | 224 | 171 | 110 |
| Fir, Commercial White | Select Structural | 694 | 689 | 678 | 664 | 641 | 611 | 482 | 335 | 246 | 188 | 121 |
| | Common Structural | 557 | 554 | 549 | 542 | 530 | 515 | 449 | 335 | 246 | 188 | 121 |
| Hemlock, Eastern | Select Structural | 694 | 689 | 678 | 664 | 641 | 611 | 482 | 335 | 246 | 188 | 121 |
| | Common Structural | 557 | 554 | 549 | 542 | 530 | 515 | 449 | 335 | 246 | 188 | 121 |
| Hemlock, West Coast | Select Structural | 893 | 885 | 872 | 852 | 823 | 783 | 614 | 426 | 313 | 240 | 153 |
| | Common Structural | 716 | 712 | 706 | 696 | 680 | 660 | 573 | 426 | 313 | 240 | 153 |
| Pine, California, Idaho, and Northern white, Pondosa, and sugar | Select Structural | 742 | 733 | 718 | 695 | 663 | 617 | 438 | 304 | 224 | 171 | 110 |
| | Common Structural | 596 | 591 | 583 | 572 | 556 | 532 | 434 | 304 | 224 | 171 | 110 |
| Pine, Norway | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Spruce, Englemann | Select Structural | 594 | 586 | 574 | 556 | 530 | 494 | 351 | 244 | 179 | 137 | 88 |
| | Common Structural | 476 | 473 | 466 | 457 | 444 | 426 | 347 | 244 | 179 | 137 | 88 |
| Spruce, red, white, and Sitka | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Tamarack | Select Structural | 988 | 976 | 955 | 923 | 877 | 817 | 570 | 396 | 291 | 223 | 142 |
| | Common Structural | 794 | 788 | 777 | 761 | 737 | 706 | 566 | 396 | 291 | 223 | 142 |

* For columns with L/d intermediate between those which are given in this table, the safe load in pounds per square inch may be determined by interpolation.
No column shall be used with greater unsupported length than 50 times its least diameter.

** When graded the same as corresponding grade of Coast Region Douglas Fir.

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TABLE III. ALLOWABLE UNIT STRESSES FOR STRUCTURAL LUMBER AND TIMBER

(Used in Locations Occasionally Wet)

(Occasionally wet but quickly dried shall apply to use in such exterior structures as bridges, trestles, grandstands, bleachers, and exposed frame work of open sheds.)

| Species of Timber | Grade | Allowable Unit Stress in Pounds per Square Inch | | | | | |
|---|---|---|---|---|---|---|---|
| | | Extreme Fibre in Bending | | Maximum Horizontal Shear | Compression | | Modulus of Elasticity |
| | | Joist & Plank Sizes; 4" and less in thickness | Beam & Stringer Sizes; 5" & Thicker | | Parallel to grain (short columns) | Perpendicular to grain | |
| Table III - A | Working Stresses for Manufacturers Association Standard Commercial Grades | | | | | | |
| Douglas Fir, Coast Region | Dense Super-Structural | 1500 | 1733 | 120 | 1333 | 265 | 1,600,000 |
| | Super-Structural and Dense Structural | 1400 | 1560 | 105 | 1200 | 240 | 1,600,000 |
| | Structural | 1240 | 1400 | 90 | 1100 | 240 | 1,600,000 |
| | Common Structural | 980 | 1200 | 84 | 1000 | 225 | 1,600,000 |
| Douglas Fir, Inland Empire | *Dense Super-Structural | 1500 | 1733 | 120 | 1333 | 265 | 1,600,000 |
| | *Dense Structural | 1400 | 1560 | 105 | 1200 | 240 | 1,600,000 |
| | No. 1 Common Dimension and Timbers | 975 | -- | 70 | 830 | 225 | 1,500,000 |
| Larch, Western | No. 1 Common Dimension and Timbers | 975 | -- | 70 | 830 | 225 | 1,300,000 |
| Pine, Southern Yellow | Extra Dense Select Structural | 1900 | 1900 | 200 | 1450 | 375 | 1,600,000 |
| | Select Structural | 1700 | 1700 | 175 | 1300 | 300 | 1,600,000 |
| | Extra Dense Heart | 1700 | 1700 | 175 | 1300 | 375 | 1,600,000 |
| | Dense Heart | 1500 | 1500 | 150 | 1150 | 300 | 1,600,000 |
| | Structural, Sq. Edge & Sound | 1350 | 1350 | 125 | 1050 | 300 | 1,600,000 |
| | No. 1 Common | 1050 | 1050 | 100 | 900 | 250 | 1,600,000 |
| Redwood | Super-Structural | 1420 | 1422 | 93 | 1280 | 160 | 1,200,000 |
| | Prime Structural | 1182 | 1245 | 82 | 1120 | 160 | 1,200,000 |
| | Select Structural | 948 | 1100 | 70 | 990 | 160 | 1,200,000 |
| | Heart Structural | 805 | 960 | 56 | 900 | 160 | 1,200,000 |
| Table III-B | Working Stresses for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards | | | | | | |
| Cedar, Alaska | Select Structural | 890 | 1000 | 90 | 744 | 200 | 1,200,000 |
| | Common Structural | 760 | 800 | 72 | 597 | 200 | 1,200,000 |
| Cedar, Northern & Southern White | Select Structural | 580 | 650 | 70 | 496 | 140 | 800,000 |
| | Common Structural | 490 | 520 | 56 | 398 | 140 | 800,000 |
| Cedar, Port Orford | Select Structural | 890 | 1000 | 90 | 818 | 200 | 1,200,000 |
| | Common Structural | 760 | 800 | 72 | 656 | 200 | 1,200,000 |
| Cedar, Western Red | Select Structural | 710 | 800 | 80 | 693 | 150 | 1,000,000 |
| | Common Structural | 600 | 640 | 64 | 557 | 150 | 1,000,000 |
| Cypress, Southern | Select Structural | 980 | 1100 | 100 | 986 | 250 | 1,200,000 |
| | Common Structural | 830 | 880 | 80 | 793 | 250 | 1,200,000 |
| Douglas Fir, Rocky Mountain Region | Select Structural | 800 | 900 | 85 | 793 | 225 | 1,200,000 |
| | Common Structural | 680 | 720 | 68 | 636 | 225 | 1,200,000 |
| Fir, Balsam | Select Structural | 670 | 750 | 70 | 596 | 125 | 1,000,000 |
| | Common Structural | 570 | 600 | 56 | 478 | 125 | 1,000,000 |
| Fir, Golden, Noble, Silver, White, (Commercial White) | Select Structural | 800 | 900 | 70 | 694 | 225 | 1,100,000 |
| | Common Structural | 680 | 720 | 56 | 557 | 225 | 1,100,000 |
| Hemlock, Eastern | Select Structural | 800 | 900 | 70 | 694 | 225 | 1,100,000 |
| | Common Structural | 680 | 720 | 56 | 557 | 225 | 1,100,000 |
| Hemlock, West Coast | Select Structural | 980 | 1100 | 75 | 893 | 225 | 1,400,000 |
| | Common Structural | 830 | 880 | 60 | 716 | 225 | 1,400,000 |
| Pine, Calif., Idaho & No. White, Lodgepole, Pondosa, Sugar | Select Structural | 710 | 800 | 85 | 742 | 150 | 1,000,000 |
| | Common Structural | 600 | 640 | 68 | 596 | 150 | 1,000,000 |
| Pine, Norway | Select Structural | 990 | 1000 | 85 | 793 | 175 | 1,200,000 |
| | Common Structural | 760 | 800 | 68 | 637 | 175 | 1,200,000 |
| Spruce, Englemann | Select Structural | 580 | 650 | 70 | 545 | 140 | 800,000 |
| | Common Structural | 490 | 520 | 56 | 437 | 140 | 800,000 |
| Spruce, Red, White, Sitka | Select Structural | 800 | 900 | 85 | 744 | 150 | 1,200,000 |
| | Common Structural | 680 | 720 | 68 | 597 | 150 | 1,200,000 |
| Tamarack, Eastern | Select Structural | 980 | 1100 | 95 | 892 | 225 | 1,300,000 |
| | Common Structural | 830 | 880 | 76 | 716 | 225 | 1,300,000 |

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* When graded the same as corresponding grade of Coast Region Douglas Fir

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TABLE IV. ALLOWABLE UNIT STRESSES FOR STRUCTURAL LUMBER AND TIMBER

(Used in Locations Usually Wet)

(Usually wet or more or less continuously damp applies to use where material is exposed to waves of tide water or in contact with earth or used in a building in portions that would be more or less continuously wet)

| Species of Timber | Grade | Allowable Unit Stress in Pounds per Square Inch | | | | | |
|---|---|---|---|---|---|---|---|
| | | Extreme Fibre in Bending | | Maximum Horizontal Shear | Compression | | Modulus of Elasticity |
| | | Joist & Plank sizes; 4" and less in thickness | Beam & Stringer Sizes; 5" & thicker | | Parallel to grain (short columns) | Perpendicular to grain | |
| **Table IV - A** | **Working Stresses for Manufacturers Association Standard Commercial Grades** | | | | | | |
| Douglas fir, Coast Region | Dense Super-Structural | 1150 | 1333 | 120 | 1133 | 235 | 1,600,000 |
| | Super-Structural and Dense Structural | 1080 | 1200 | 105 | 1000 | 215 | 1,600,000 |
| | Structural | 950 | 1100 | 90 | 933 | 215 | 1,600,000 |
| | Common Structural | 750 | 933 | 84 | 850 | 200 | 1,600,000 |
| Douglas fir, Inland Empire | * Dense Super-Structural | 1150 | 1333 | 120 | 1133 | 235 | 1,600,000 |
| | * Dense Structural | 1080 | 1200 | 105 | 1000 | 215 | 1,600,000 |
| | No. 1 Common Dimension and Timbers | 705 | -- | 70 | 655 | 200 | 1,500,000 |
| Larch, Western | No. 1 Common Dimension and Timbers | 705 | -- | 70 | 655 | 200 | 1,300,000 |
| Pine, Southern Yellow | Extra Dense Select Structural | 1500 | 1500 | 200 | 1200 | 325 | 1,600,000 |
| | Select Structural | 1300 | 1300 | 175 | 1100 | 250 | 1,600,000 |
| | Extra Dense Heart | 1300 | 1300 | 175 | 1100 | 325 | 1,600,000 |
| | Dense Heart | 1200 | 1200 | 150 | 1000 | 250 | 1,600,000 |
| | Structural Sq. Edge & Sound | 1100 | 1100 | 125 | 950 | 250 | 1,600,000 |
| | No. 1 Common | 800 | 800 | 100 | 800 | 200 | 1,600,000 |
| Redwood | Super-Structural | 1135 | 1138 | 93 | 1067 | 133 | 1,200,000 |
| | Prime Structural | 945 | 995 | 82 | 933 | 133 | 1,200,000 |
| | Select Structural | 758 | 880 | 70 | 825 | 133 | 1,200,000 |
| | Heart Structural | 644 | 768 | 56 | 750 | 133 | 1,200,000 |
| **Table IV-B** | **Working Stresses for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards** | | | | | | |
| Cedar, Alaska | Select Structural | 800 | 900 | 90 | 646 | 150 | 1,200,000 |
| | Common Structural | 680 | 720 | 72 | 518 | 150 | 1,200,000 |
| Cedar, Northern & Southern White | Select Structural | 530 | 600 | 70 | 447 | 100 | 800,000 |
| | Common Structural | 450 | 480 | 56 | 358 | 100 | 800,000 |
| Cedar, Port Orford | Select Structural | 800 | 900 | 90 | 744 | 150 | 1,200,000 |
| | Common Structural | 680 | 720 | 72 | 597 | 150 | 1,200,000 |
| Cedar, Western Red | Select Structural | 670 | 750 | 80 | 645 | 125 | 1,000,000 |
| | Common Structural | 570 | 600 | 64 | 517 | 125 | 1,000,000 |
| Cypress, Southern | Select Structural | 800 | 900 | 100 | 793 | 225 | 1,200,000 |
| | Common Structural | 680 | 720 | 80 | 636 | 225 | 1,200,000 |
| Douglas fir, Rocky Mountain Region | Select Structural | 620 | 700 | 85 | 695 | 200 | 1,200,000 |
| | Common Structural | 530 | 560 | 68 | 558 | 200 | 1,200,000 |
| Fir, Balsam | Select Structural | 530 | 600 | 70 | 498 | 100 | 1,000,000 |
| | Common Structural | 450 | 480 | 56 | 399 | 100 | 1,000,000 |
| Fir, Golden, Noble, Silver, White (Commercial White) | Select Structural | 710 | 800 | 70 | 596 | 200 | 1,100,000 |
| | Common Structural | 600 | 640 | 56 | 478 | 200 | 1,100,000 |
| Hemlock, Eastern | Select Structural | 710 | 800 | 70 | 596 | 200 | 1,100,000 |
| | Common Structural | 600 | 640 | 56 | 478 | 200 | 1,100,000 |
| Hemlock, West Coast | Select Structural | 800 | 900 | 75 | 795 | 200 | 1,400,000 |
| | Common Structural | 680 | 729 | 60 | 637 | 200 | 1,400,000 |
| Pine, California, Idaho & Northern White, Lodgepole, Pondosa, Sugar | Select Structural | 670 | 750 | 85 | 645 | 125 | 1,000,000 |
| | Common Structural | 570 | 600 | 68 | 517 | 125 | 1,000,000 |
| Pine, Norway | Select Structural | 710 | 800 | 85 | 695 | 150 | 1,200,000 |
| | Common Structural | 600 | 640 | 68 | 558 | 150 | 1,200,000 |
| Spruce, Englemann | Select Structural | 440 | 500 | 70 | 447 | 100 | 800,000 |
| | Common Structural | 370 | 400 | 56 | 358 | 100 | 800,000 |
| Spruce, red, white, Sitka | Select Structural | 710 | 800 | 85 | 646 | 125 | 1,200,000 |
| | Common Structural | 600 | 640 | 68 | 516 | 125 | 1,200,000 |
| Tamarack, Eastern | Select Structural | 800 | 900 | 95 | 794 | 200 | 1,300,000 |
| | Common Structural | 680 | 720 | 76 | 637 | 200 | 1,300,000 |

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* When graded the same as corresponding grade of Coast Region Douglas Fir

## TABLE V - SAFE LOAD IN POUNDS PER SQUARE INCH OF CROSS-SECTIONAL AREA OF SQUARE AND RECTANGULAR TIMBER COLUMNS (LOCATIONS OCCASIONALLY WET)

Safe Load in Pounds per square inch of cross sectional area of square and rectangular timber columns used in Locations Occasionally Wet but Quickly Dried. This condition of use applies to exterior structures such as bridges, trestles, grandstands or bleachers and open sheds. For other conditions of use, see Tables II and VI.

| Species of Timber | Grade | * Ratio of Length to Least Dimension (L/d) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 & less lbs. | L/d 12 lbs. | L/d 14 lbs. | L/d 16 lbs. | L/d 18 lbs. | L/d 20 lbs. | L/d 25 lbs. | L/d 30 lbs. | L/d 35 lbs. | L/d 40 lbs. | L/d 50 lbs. |
| Table V - A | Allowable Column Loads for Manufacturers Association Standard Commercial Grades | | | | | | | | | | | |
| Douglas fir, Coast Region | Dense Super-Str. | 1333 | 1295 | 1263 | 1214 | 1141 | 1041 | 702 | 487 | 358 | 274 | 175 |
| | Super-Str. and Dense Structural | 1200 | 1176 | 1152 | 1112 | 1059 | 986 | 702 | 487 | 358 | 274 | 175 |
| | Structural | 1100 | 1079 | 1060 | 1032 | 992 | 937 | 702 | 487 | 358 | 274 | 175 |
| | Com. Structural | 1000 | 984 | 971 | 950 | 920 | 877 | 700 | 487 | 358 | 274 | 175 |
| Douglas fir, Inland Empire | **Dense Super-Str. | 1333 | 1295 | 1263 | 1214 | 1141 | 1041 | 702 | 487 | 358 | 274 | 175 |
| | **Dense Structural | 1200 | 1176 | 1152 | 1112 | 1059 | 986 | 702 | 487 | 358 | 274 | 175 |
| | No. 1 Common Dimension & Timbers | 830 | 819 | 810 | 796 | 776 | 748 | 531 | 457 | 336 | 257 | 164 |
| Larch, Western | No. 1 Common Dimension & Timbers | 830 | 816 | 805 | 786 | 759 | 723 | 568 | 396 | 291 | 263 | 142 |
| Pine, Southern Yellow | Extra Dense Heart | 1300 | 1265 | 1235 | 1190 | 1125 | 1027 | 701 | 487 | 358 | 274 | 175 |
| | Dense heart | 1150 | 1127 | 1104 | 1070 | 1024 | 966 | 701 | 487 | 358 | 274 | 175 |
| | Str. Sq. Edge & Sound | 1050 | 1029 | 1019 | 987 | 955 | 903 | 703 | 487 | 358 | 274 | 175 |
| | No. 1 Common | 900 | 888 | 878 | 862 | 842 | 810 | 675 | 487 | 358 | 274 | 175 |
| Redwood | Super-Structural | 1280 | 1221 | 1169 | 1094 | 979 | 822 | 526 | 365 | 268 | 206 | 132 |
| | Prime Structural | 1120 | 1080 | 1046 | 993 | 912 | 806 | 526 | 365 | 268 | 206 | 132 |
| | Select Structural | 990 | 963 | 938 | 903 | 851 | 778 | 526 | 365 | 268 | 206 | 132 |
| | Heart Structural | 900 | 879 | 861 | 843 | 796 | 739 | 526 | 365 | 268 | 206 | 132 |
| Table V-B | Allowable Column Loads for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards | | | | | | | | | | | |
| Cedar, Alaska | Select Structural | 744 | 738 | 728 | 712 | 689 | 657 | 523 | 365 | 268 | 206 | 132 |
| | Common Structural | 597 | 594 | 588 | 581 | 569 | 552 | 485 | 365 | 268 | 206 | 132 |
| Cedar, Northern & Southern White | Select Structural | 496 | 492 | 485 | 474 | 459 | 438 | 348 | 244 | 179 | 137 | 88 |
| | Common Structural | 398 | 396 | 392 | 387 | 379 | 368 | 323 | 244 | 179 | 137 | 88 |
| Cedar, Port Orford | Select Structural | 818 | 808 | 795 | 774 | 744 | 702 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 656 | 652 | 645 | 634 | 618 | 597 | 506 | 365 | 268 | 206 | 132 |
| Cedar, Western Red | Select Structural | 693 | 686 | 674 | 656 | 629 | 592 | 438 | 304 | 224 | 171 | 110 |
| | Common Structural | 557 | 553 | 547 | 538 | 524 | 505 | 425 | 304 | 224 | 171 | 110 |
| Cypress, Southern | Select Structural | 986 | 972 | 947 | 910 | 856 | 781 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 793 | 786 | 773 | 754 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| Douglas fir, Rocky Mt. Type | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Fir, Balsam | Select Structural | 596 | 591 | 583 | 572 | 556 | 532 | 434 | 304 | 224 | 171 | 110 |
| | Common Structural | 478 | 476 | 472 | 466 | 457 | 445 | 395 | 304 | 224 | 171 | 110 |
| Fir, Commercial White | Select Structural | 694 | 689 | 678 | 664 | 641 | 611 | 482 | 335 | 246 | 188 | 121 |
| | Common Structural | 557 | 554 | 549 | 542 | 530 | 515 | 449 | 335 | 246 | 188 | 121 |
| Hemlock, Eastern | Select Structural | 694 | 689 | 678 | 664 | 641 | 611 | 482 | 335 | 246 | 188 | 121 |
| | Common Structural | 557 | 554 | 549 | 542 | 530 | 515 | 449 | 335 | 246 | 188 | 121 |
| Hemlock, West Coast | Select Structural | 893 | 885 | 872 | 852 | 823 | 783 | 614 | 426 | 313 | 240 | 153 |
| | Common Structural | 716 | 712 | 706 | 696 | 680 | 660 | 573 | 426 | 313 | 240 | 153 |
| Pine, California, Idaho and northern white, Pondosa & sugar | Select Structural | 742 | 733 | 718 | 695 | 663 | 617 | 438 | 304 | 224 | 171 | 110 |
| | Common Structural | 596 | 591 | 583 | 572 | 556 | 532 | 434 | 304 | 224 | 171 | 110 |
| Pine, Norway | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Spruce, Englemann | Select Structural | 545 | 540 | 530 | 516 | 496 | 468 | 351 | 244 | 179 | 137 | 88 |
| | Common Structural | 437 | 435 | 430 | 423 | 412 | 398 | 338 | 244 | 179 | 137 | 88 |
| Spruce, red, white and Sitka | Select Structural | 744 | 738 | 728 | 712 | 689 | 657 | 523 | 365 | 268 | 206 | 132 |
| | Common Structural | 597 | 594 | 588 | 581 | 569 | 552 | 485 | 365 | 268 | 206 | 132 |
| Tamarack | Select Structural | 892 | 882 | 868 | 844 | 811 | 765 | 570 | 396 | 291 | 223 | 142 |
| | Common Structural | 716 | 711 | 703 | 691 | 674 | 650 | 548 | 396 | 291 | 223 | 142 |

* For columns with L/d intermediate between those which are given in this table, the safe load in pounds per square inch may be determined by interpolation.
No column shall be used with greater unsupported length than 50 times its least diameter.

** When graded the same as corresponding grade of Coast Region Douglas Fir

TABLE VI - SAFE LOAD IN POUNDS PER SQUARE INCH OF CROSS-SECTIONAL AREA OF SQUARE AND RECTANGULAR TIMBER COLUMNS (LOCATIONS USUALLY WET)

Safe Load in Pounds per square inch of cross sectional area of square and rectangular columns used in Locations Usually Wet. This condition of use applies where material is exposed to waves of tide water or in contact with earth or where it is more or less continuously damp or wet. For other conditions of use, see Tables II and V.

| Species of Timber | Grade | * Ratio of Length to Least Dimension (L/d) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 & less lbs. | L/d 12 lbs. | L/d 14 lbs. | L/d 16 lbs. | L/d 18 lbs. | L/d 20 lbs. | L/d 25 lbs. | L/d 30 lbs. | L/d 35 lbs. | L/d 40 lbs. | L/d 50 lbs. |
| Table VI - A | Allowable Column Loads for Manufacturers Association Standard Commercial Grades | | | | | | | | | | | |
| Douglas fir, Coast Region | Dense Super-Str. | 1133 | 1110 | 1087 | 1059 | 1015 | 954 | 702 | 487 | 358 | 274 | 175 |
| | Super-Str. and Dense Structural | 1000 | 984 | 971 | 950 | 920 | 877 | 700 | 487 | 358 | 274 | 175 |
| | Structural | 933 | 920 | 909 | 891 | 867 | 833 | 689 | 487 | 358 | 274 | 175 |
| | Com. Structural | 850 | 840 | 832 | 819 | 800 | 774 | 665 | 487 | 358 | 274 | 175 |
| Douglas fir, Inland Empire | **Dense Super-Str. | 1133 | 1110 | 1087 | 1059 | 1015 | 954 | 702 | 487 | 358 | 274 | 175 |
| | **Dense Structural | 1000 | 984 | 971 | 950 | 920 | 877 | 700 | 487 | 358 | 274 | 175 |
| | No. 1 Common Dimension & Timbers | 655 | 651 | 645 | 638 | 628 | 615 | 561 | 453 | 336 | 257 | 164 |
| Larch, Western | No. 1 Common Dimension & Timbers | 655 | 648 | 641 | 633 | 620 | 602 | 528 | 396 | 291 | 223 | 142 |
| Pine, Southern Yellow | Extra Dense Heart | 1100 | 1078 | 1060 | 1034 | 990 | 935 | 701 | 487 | 358 | 274 | 175 |
| | Dense Heart | 1000 | 984 | 970 | 950 | 920 | 680 | 700 | 487 | 358 | 274 | 175 |
| | Str. Sq. Edge & Sound | 950 | 940 | 921 | 902 | 874 | 845 | 684 | 487 | 358 | 274 | 175 |
| | No. 1 Common | 800 | 792 | 785 | 774 | 758 | 737 | 650 | 487 | 358 | 274 | 175 |
| Redwood | Super Structural | 1067 | 1030 | 1002 | 958 | 893 | 804 | 526 | 365 | 268 | 206 | 132 |
| | Prime Structural | 933 | 909 | 891 | 861 | 806 | 754 | 526 | 365 | 268 | 206 | 132 |
| | Select Structural | 825 | 808 | 796 | 772 | 744 | 701 | 526 | 365 | 268 | 206 | 132 |
| | Heart Structural | 750 | 738 | 727 | 711 | 687 | 657 | 520 | 365 | 268 | 206 | 132 |
| Table VI-B | Allowable Column Loads for Structural Lumber and Timber Graded under the Structural Grade Examples of the American Lumber Standards | | | | | | | | | | | |
| Cedar, Alaska | Select Structural | 646 | 642 | 636 | 625 | 611 | 590 | 504 | 365 | 268 | 206 | 132 |
| | Common Structural | 518 | 516 | 513 | 507 | 500 | 489 | 444 | 364 | 268 | 206 | 132 |
| Cedar, Northern & Southern White | Select Structural | 447 | 444 | 439 | 432 | 420 | 405 | 340 | 244 | 179 | 137 | 88 |
| | Common Structural | 358 | 357 | 354 | 351 | 345 | 337 | 304 | 243 | 179 | 137 | 88 |
| Cedar, Port Orford | Select Structural | 744 | 738 | 728 | 712 | 689 | 657 | 523 | 365 | 268 | 206 | 132 |
| | Common Structural | 597 | 594 | 588 | 581 | 569 | 552 | 485 | 365 | 268 | 206 | 132 |
| Cedar, Western Red | Select Structural | 645 | 639 | 629 | 614 | 593 | 564 | 439 | 304 | 224 | 171 | 110 |
| | Common Structural | 517 | 514 | 510 | 502 | 491 | 476 | 412 | 304 | 224 | 171 | 110 |
| Cypress, Southern | Select Structural | 793 | 786 | 774 | 753 | 726 | 688 | 526 | 365 | 268 | 206 | 132 |
| | Common Structural | 636 | 632 | 627 | 617 | 602 | 582 | 500 | 365 | 268 | 206 | 132 |
| Douglas fir, Rocky Mt. Type | Select Structural | 695 | 690 | 682 | 669 | 651 | 625 | 518 | 365 | 268 | 206 | 132 |
| | Common Structural | 558 | 555 | 551 | 544 | 535 | 521 | 466 | 365 | 268 | 206 | 132 |
| Fir, Balsam | Select Structural | 498 | 495 | 490 | 484 | 474 | 460 | 404 | 304 | 224 | 171 | 110 |
| | Common Structural | 399 | 397 | 395 | 392 | 387 | 380 | 351 | 298 | 224 | 171 | 110 |
| Fir, Commercial White | Select Structural | 596 | 593 | 587 | 577 | 563 | 544 | 463 | 335 | 246 | 188 | 121 |
| | Common Structural | 478 | 476 | 473 | 468 | 461 | 451 | 409 | 334 | 246 | 188 | 121 |
| Hemlock, Eastern | Select Structural | 596 | 593 | 587 | 577 | 563 | 544 | 463 | 335 | 246 | 188 | 121 |
| | Common Structural | 478 | 476 | 473 | 468 | 461 | 451 | 409 | 334 | 246 | 188 | 121 |
| Hemlock, West Coast | Select Structural | 795 | 790 | 780 | 766 | 746 | 718 | 598 | 426 | 313 | 240 | 153 |
| | Common Structural | 637 | 634 | 630 | 623 | 612 | 598 | 537 | 426 | 313 | 240 | 153 |
| Pine, California, Idaho & Northern White, Pondosa, & Sugar | Select Structural | 645 | 639 | 629 | 614 | 593 | 564 | 439 | 304 | 224 | 171 | 110 |
| | Common Structural | 517 | 514 | 510 | 502 | 491 | 476 | 412 | 304 | 224 | 171 | 110 |
| Pine, Norway | Select Structural | 695 | 690 | 682 | 669 | 651 | 625 | 518 | 365 | 268 | 206 | 132 |
| | Common Structural | 558 | 555 | 551 | 544 | 535 | 521 | 466 | 365 | 268 | 206 | 132 |
| Spruce, Engelmann | Select Structural | 447 | 444 | 439 | 432 | 420 | 405 | 340 | 244 | 179 | 137 | 88 |
| | Common Structural | 358 | 357 | 354 | 351 | 345 | 337 | 304 | 243 | 179 | 137 | 88 |
| Spruce, red, white & Sitka | Select Structural | 646 | 642 | 636 | 625 | 611 | 590 | 504 | 365 | 268 | 206 | 132 |
| | Common Structural | 518 | 516 | 513 | 507 | 500 | 489 | 444 | 364 | 268 | 206 | 132 |
| Tamarack | Select Structural | 794 | 788 | 777 | 761 | 737 | 706 | 566 | 396 | 291 | 223 | 142 |
| | Common Structural | 637 | 634 | 628 | 620 | 608 | 591 | 520 | 396 | 291 | 223 | 142 |

* For columns with L/d intermediate between those which are given in this table, the safe load in pounds per square inch may be determined by interpolation.
No column shall be used with greater unsupported length than 50 times its least diameter.

** When graded the same as corresponding grade of Coast Region Douglas Fir